WESTERN GAS

July
1930

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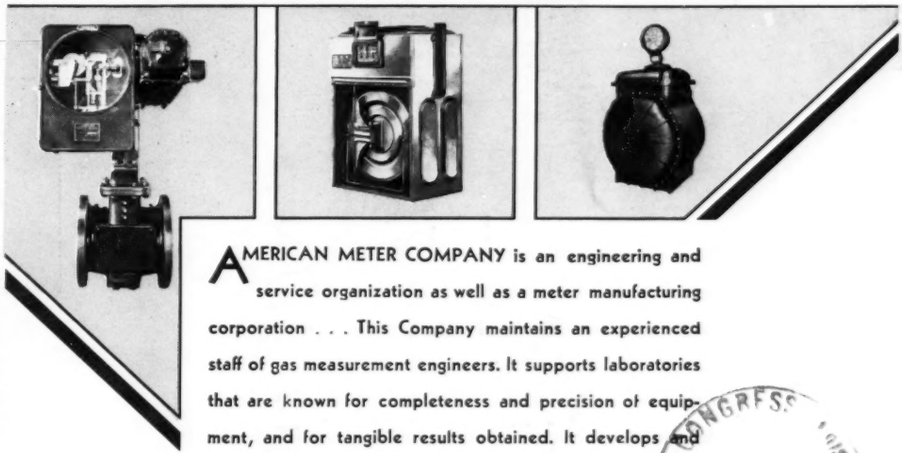
Many Activities. A Single Objective.... Your Satisfaction



AMERICAN METER COMPANY is an engineering and service organization as well as a meter manufacturing corporation . . . This Company maintains an experienced staff of gas measurement engineers. It supports laboratories that are known for completeness and precision of equipment, and for tangible results obtained. It develops and manufactures gas and meter testing apparatus that is standard equipment in laboratories . . . American Meter Company Gas Meters are the result of long experience, practical research and painstaking manufacture. Their serviceability and accuracy makes them economical to use . . . An outline of the complete information furnished by American Meter Company service on the various requirements of gas measurement engineering will be sent on request.

AMERICAN METER COMPANY
Incorporated
General Offices: 105 West 40th St., New York, New York

A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES

TP700
P3

THE PERFECT APPLICATION OF A PRINCIPLE

Resists Sticking

Hydraulic pressure available up to 2,000 pounds to the square inch and a lubricant specially compounded by us, are responsible for the ease and convenience of eliminating any tendency to "freeze" in a Nordstrom Valve.

This pressure forces the lubricant down around the plug to a chamber at the bottom of the valve, where the lubricant exerts an upward pressure on the plug, should the plug ever become tight. This hydraulic lubricating principle is patented and positive in action.

"Merco" Lubricants should be used in Nordstrom Valves for most efficient operation. Carefully compounded from the best materials. A special lubricant for every valve service.

"Merco" Pipe Compound permanently stops leaks in joints, gaskets, etc. Ask for details.

MERCO NORDSTROM VALVE COMPANY

SUBSIDIARY OF THE MERRILL COMPANY . . ENGINEERS

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Resists Leaks

Hydraulic pressure also eliminates leaks in the Nordstrom Valve and assures positive shut-off. The lubricant, under pressure, is forced through ducts down and around the plug, and when the valve is turned, complete sealing results. At the same time the plug is lubricated.

Some Uses in the Gas Industry

Gas manifolds, Regulator pits, Liquors, Dilute sulphuric acid, Steam lines, Air lines, Transmission and distribution lines.

Ask for latest Catalog.

NORDSTROM VALVES

Fluor COOLING TOWERS

are Dependable

Quality: Only the best materials obtainable are used throughout in the construction of Fluor Cooling Towers—select California redwood, free from sap or knots—all framework is bolted together with heavy brass bolts and the tower is braced transversely and longitudinally to withstand high winds and heavy ice loads. These are structural reasons for the long life and dependability of Fluor Cooling Towers.

Performance: Fluor double panel decks provide maximum of efficient cooling, without retarding free passage of air upward through the tower. Our gravity overflow distributing system maintains good distribution through a wide range of capacities. The patented arrangement of decking panels redistributes the water in high winds. Spray eliminators reduce windage losses to the minimum — consistent with good performance. Close approach to wet bulb temperature.

Service: For large towers up to 1,000 gallons per minute capacity, we can make prompt shipment from stock parts. Standardization permits speedy erection in the field. Towers in service are given periodical inspection and adjustments are made when necessary. Special attention given to additions and extensions.

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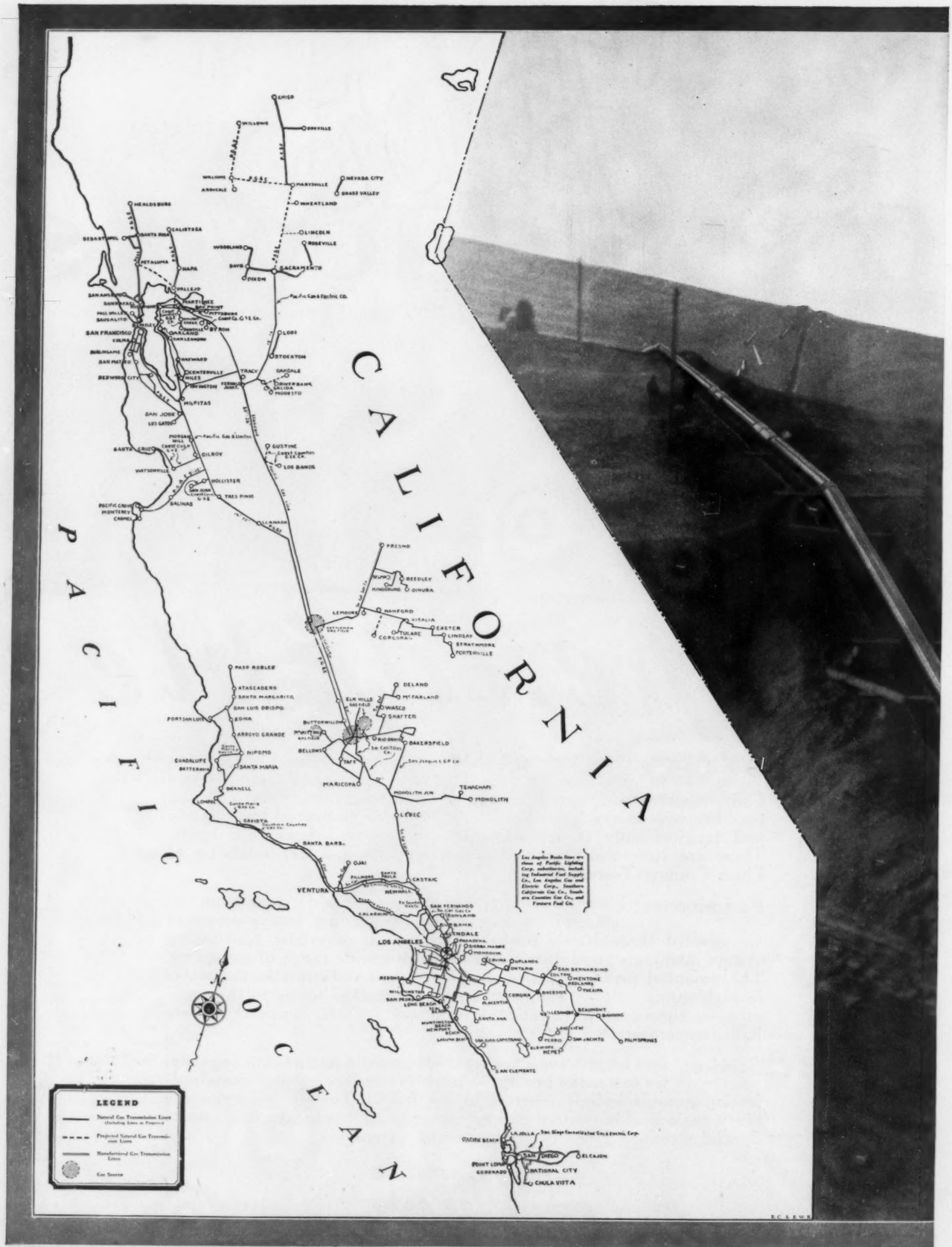

SMITHWELDED

"...as you know,

our 20" pipeline job was finished and put into service in accordance with our advance schedule on February 1st, and since then has been operating every day without the slightest indication of any trouble. This alone should indicate to you that we are quite satisfied with the job—in fact, I have received more personal satisfaction from this particular job than any other pipe line that I have constructed in recent years."

Mr. William Moeller, Jr., *Manager*
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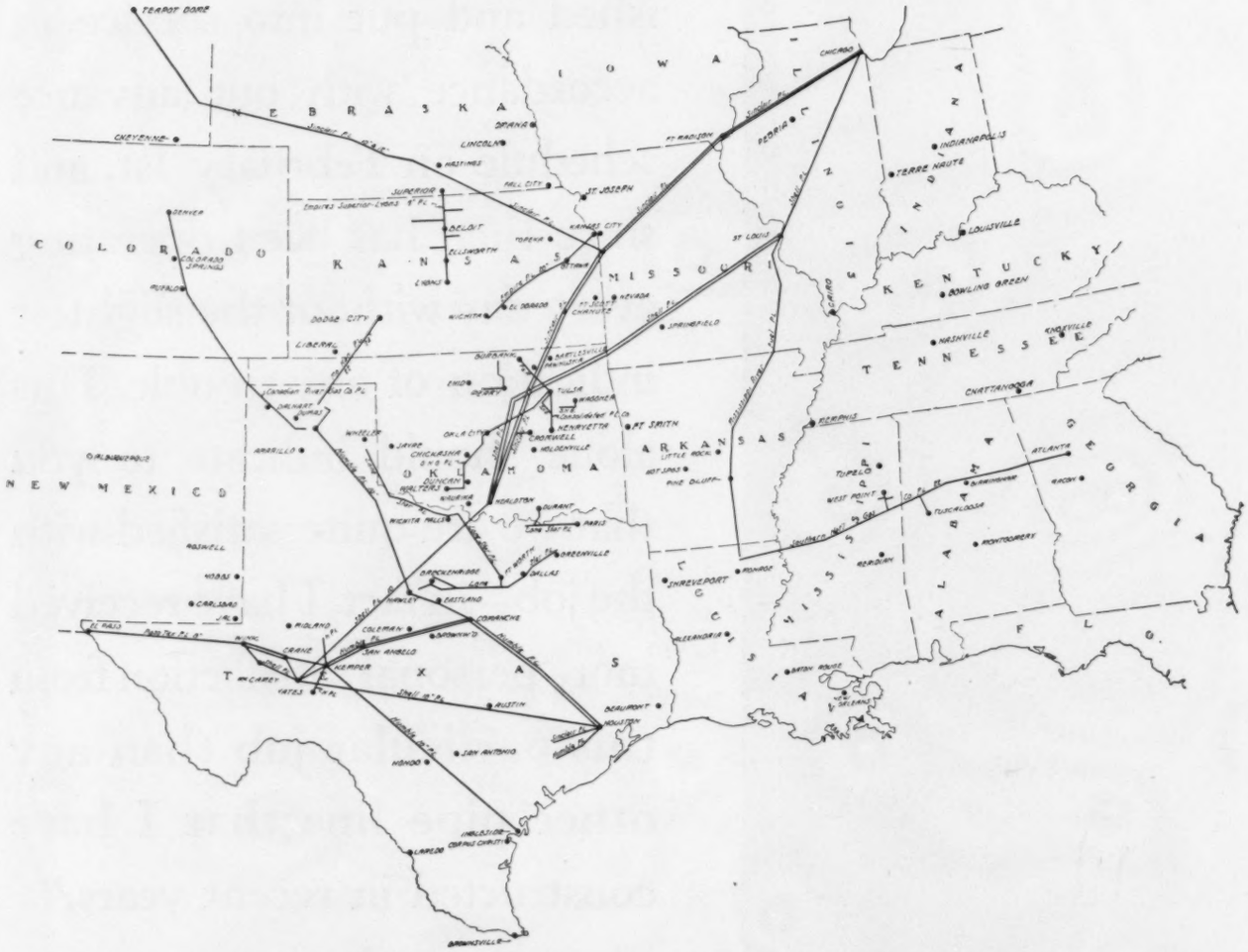
We Have Built

Over 5,000 Miles of Pipe Lines

in the past 12 years



REFERENCES

Lone Star Gas Company
Sinclair Pipe Line Company
Pasotex Pipe Line Company
Canadian River Gas Company
Producers and Refiners Corporation
Southern Natural Gas Corporation
Cities Service Company
Shell Pipe Line Company
Humble Pipe Line Company
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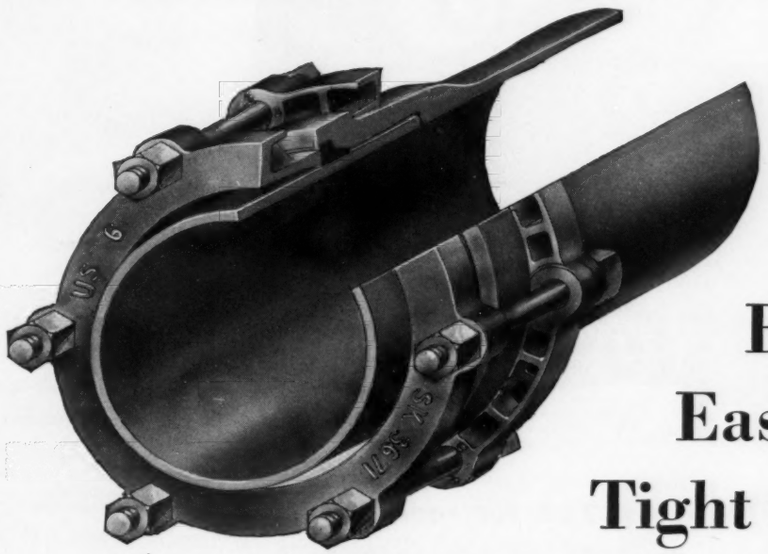
the improved ANTHONY JOINT

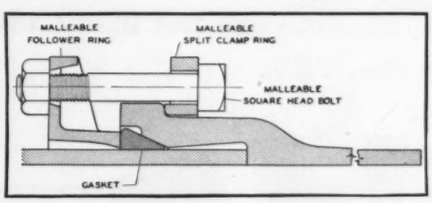


High deflection
Easy to assemble
Tight under pressure

Here's the joint many engineers have been looking for—a joint that is 100% gas-tight under high pressures, a joint that allows for unusual deflection and which can be quickly assembled by unskilled labor.

This improved Anthony Joint has been developed after exhaustive experiment and study of the needs of the gas industry. It embodies the most favorable features of the sleeve type joint, together with improvements suggested by gas officials and engineers. The Anthony Joint eliminates troublesome calking and pouring. Just put the gasket in place, tighten up the bolts and the Anthony Joint is complete. Here's a joint that you can depend on too. Tests have shown that high pressures and maximum deflection cannot make it leak.

The improved Anthony Joint is the same for either deLavaud centrifugally cast pipe or pit cast pipe and fittings. All accessories are interchangeable. Of special interest is the fact that Anthony Joint tees, reducers and other fittings can also be used with plain end pipe. Let us send you complete information regarding the many advantages which this new joint offers.



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Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association

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House Service Regulation

Fisher Type 725 (Pats. Pend.)

FISHER now offers the Type No. 725 for reducing high initial gas pressures (1 lb. to 300 lbs.) to inches of water for house service duty.

New in design, yet thoroughly proved, manufactured for the past three years and many thousand now in service.

Incorporates entirely new and exclusive cantilever operating spring which eliminates all levers, lost motion, friction and bearing points.

Particularly designed for Butane and natural gas distribution, also suitable for artificial gas.

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for all pressures—liquids, gases, steam
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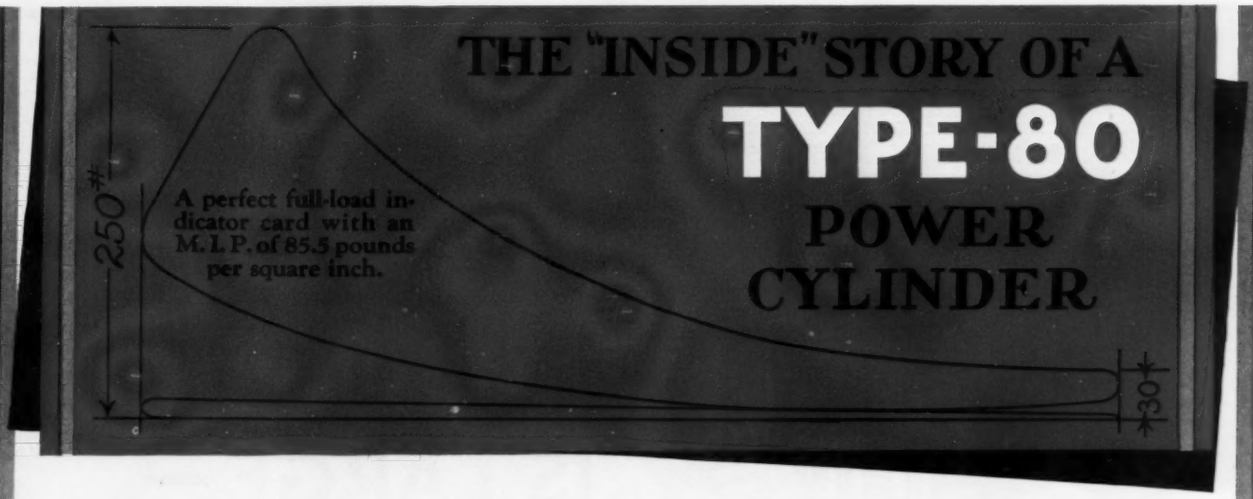

THE "INSIDE" STORY OF A TYPE-80 POWER CYLINDER

THERE'S always a lot of satisfaction in taking a card on a Type-80. You know before you get through that it will probably tell a good story.

It's these monthly inspection pictures of power cylinder performance which keep plant men posted. Even if a Type-80 card is a little off you can make the necessary adjustments and be back on the load in record time. This accessibility reduces shut-down time and makes Type-80's first choice with many operators.

Because the indicator motion is built right into the engine, both power and compressor cylinder cards can be easily taken. In this way operators can maintain the uniformly high standards of performance which have established the leadership of Type-80 in its field.

Note: A special series of articles has been prepared on the subject, "The Engine Indicator as a Guide to Performance." A post card will bring you a copy without obligation.

As told by the Indicator Card

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Formerly The C. & G. Cooper Co. and The Bessemer Gas Engine Co.

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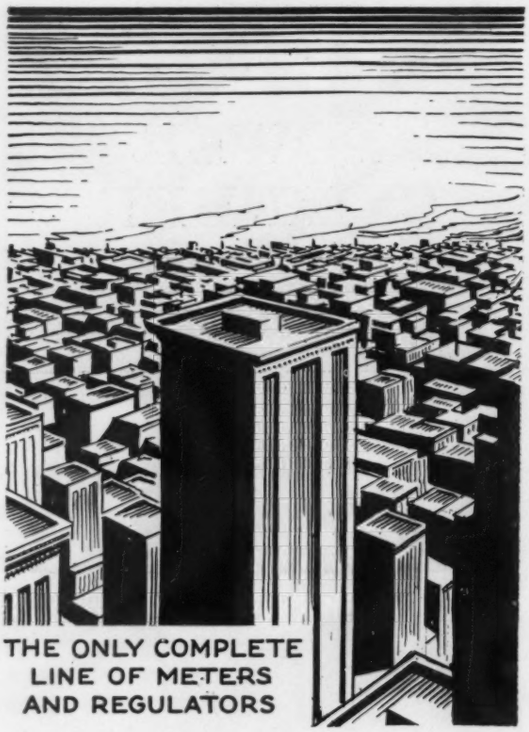

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WHERE THE CONSUMPTION IS LARGE— EMCOS

EMCO Large Capacity Meters, whether sizes 2½, 3, 4 or 5, are built for the jobs they have to do. The rugged case construction assures safety. They require a minimum amount of your consumer's valuable floor space. Manifold installations are easily made and are compact. If repairs or inspections are necessary, make them while the meter is in the line. They are accurate.

EMCO PRINCIPLES

Rolling Type Diaphragm · Diaphragm Drains
Case Construction—Rugged Beyond Compare
Moving Parts Easily Accessible
Repair Them in the Line

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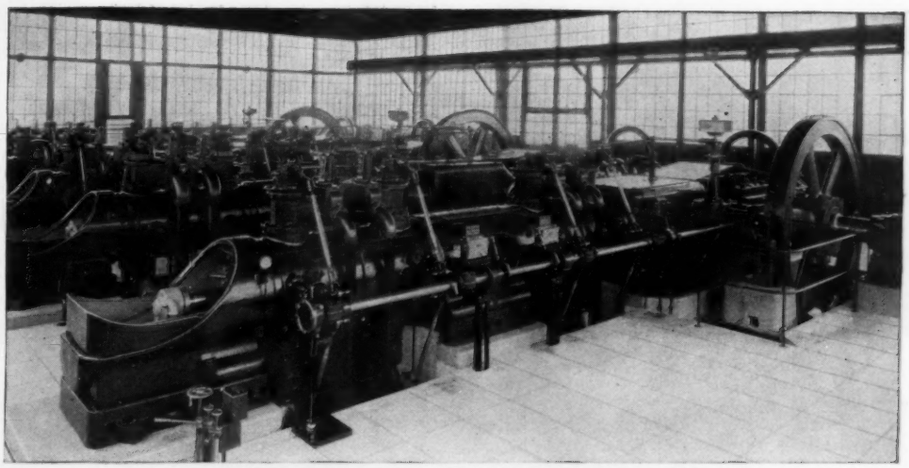
Worthington Gas-engine-driven Gas Compressors in the Guthrie, La., Station of the Memphis Natural Gas Company on the Monroe-Memphis Pipe Line. Installed by A. M. Lockett & Company under contract from Ford, Bacon & Davis.



7 facts . . . *about* Worthington Gas Engine Compressors

IN this day of booming natural gas projects, it is interesting to consider seven pertinent facts regarding Worthington Gas-engine-driven Gas Compressors:

1. Worthington is the oldest builder of gas engines in the United States. The first unit of this type of equipment was built for the Columbia Natural Gas Company in 1900.
2. Worthington gas engines now installed total close to 400,000 horsepower.
3. During the last four years, Worthington has furnished more than 100,000 horsepower in gas-engine-driven compressors for the natural gas pipe lines.
4. Over 50% of the gas-engine-driven gas compressors now in service are Worthingtons.
5. The low maintenance cost in Worthington-equipped compressor stations is a factor well-known throughout the natural gas industry. This is the result of good substantial design and careful workmanship, reflected in the ability to carry full load without effort.
6. Because of Worthington's established reputation for leadership in this field, prominent pipe line companies have felt justified in paying a higher price for Worthington Compressors than for competitive equipment.
7. Worthington, in collaboration with its associates, A. M. Lockett & Company, New Orleans, La., is in a position to build and equip modern compressor stations, complete in every detail.

Your inquiries are invited. *Ask for Bulletin S-550-B1.*

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COMPRESSORS
Stationary and Portable
CONDENSERS
and Auxiliaries
DIESEL ENGINES
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BITURINE ENAMEL armors this pipe line against its enemy "CORROSION"

TODAY, scarcely a foot of steel pipe goes into the ground unless it is protected in some manner against corrosion. Stretching over the country in every direction are thousands of miles of pipe lines that have been covered with Biturine as armor against acids, alkalis and moisture. These thousands of miles of pipe lines are covered with Biturine because it has proved through years of effective service and competitive tests its ability to give practically 100% service under all conditions of soil and climate.

• • •

Biturine is not to be confused with ordinary bituminous products. It is essentially different, and better. Its base is sulphur-free coke-oven pitch run to our own specifications, then blended with the utmost care at high temperatures with refined natural asphalts. Then the mixture is processed to produce a perfect chemical combination of the bitumens. The result is a coating that is impervious to water or moisture and proof against soil acids and alkalis. Corrosion hasn't a chance when pipe is protected with Biturine.

BITURINE COATINGS

Biturine Enamel — Biturine Enamel Primer★
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Biturine Solution No. 5 — Biturine 70-30

We shall be glad to send you, on request, literature about Biturine Coatings, together with a list of satisfied users.

Get the Facts About the Newest Method of Pipe Protection

The most important development of the past twenty-five years in pipe-protection is the new Hill, Hubbell & Company method of mechanically coating and wrapping *pipe at the mill.* If you are contemplating laying new lines you should get the facts about this process now available for the production of six leading pipe mills. Biturine Coatings are particularly adapted for use with this process, but specifications are available covering a wide range of materials and combinations.

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with maximum safety and economy

WHETHER the job is a long gas line through the country or a main under city streets, the prime requisite is dependability. Dependability when the service begins—dependability through the years.

Starting off with the right pipe is the surest way to lay a line that will remain sound and dependable from end to end. The right pipe has high tensile strength, sufficient ductility, accurately finished ends, good welding qualities, resistance to corrosion—and is available in double random lengths. Such pipe gives promise of maximum safety and economy through the years to come. NATIONAL Pipe is the right pipe. That is why gas companies rely so generally on NATIONAL dependability.

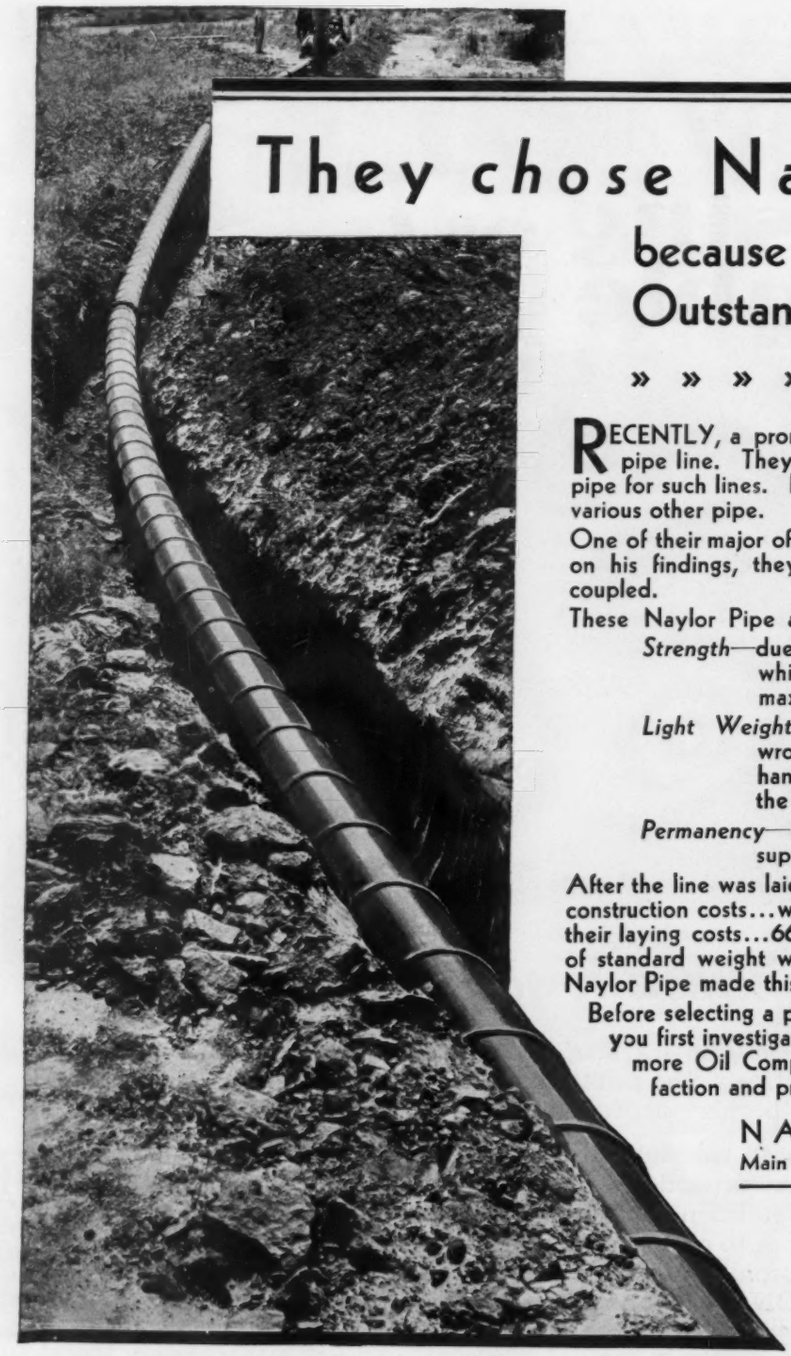
Remember, NATIONAL double random lengths cut the number of joints to about one-half . . . reduce the possibility of leakage . . . and mean a considerable saving in time, labor and joint-making materials—another reason why NATIONAL is—

AMERICA'S STANDARD WROUGHT PIPE

NATIONAL TUBE COMPANY • Pittsburgh, Pa.

Subsidiary of United States Steel Corporation

NATIONAL PIPE



They chose Naylor Pipe

because of Three Outstanding Advantages » » »

» » » » Then discovered one advantage had reduced their laying costs 66 2/3%:

RECENTLY, a prominent oil company planned to lay a 10-inch pipe line. They had customarily used standard weight wrought pipe for such lines. But this time decided to thoroughly investigate various other pipe.

One of their major officials conducted the investigation. And, based on his findings, they *chose* Naylor Pipe, 40-ft. lengths, Victaulic coupled.

These Naylor Pipe advantages had determined their final choice:

Strength—due to the spiralwelded lock-seam truss which, while permitting the use of lighter material, assures maximum structural strength.

Light Weight—one half the weight of standard weight wrought pipe, which means less freight charges, less handling costs in the field, and speedier laying of the line.

Permanency—because it is made of Toncan Iron which has a superior resistance to rust and corrosion.

After the line was laid, the Oil Company made an analysis of the construction costs...which revealed that Naylor Pipe had reduced their laying costs...66 2/3%...as compared with previous layings of standard weight wrought pipe. The light weight advantage of Naylor Pipe made this saving possible.

Before selecting a pipe for your next line...may we suggest that you first investigate the advantages of Naylor Pipe? More and more Oil Companies are doing so---to their decided satisfaction and profit.

NAYLOR PIPE COMPANY
Main Office and Plant, 1230 East 92nd Street, CHICAGO

Sales Offices:
3116 Chrysler Building, New York
Witherspoon Building, Philadelphia
507 Philtower Building, Tulsa
601 Post-Dispatch Building, Houston
Montreal, Can., Mechanical Equipment Co.
660 St. Catherine St., West

Installation in Oklahoma of 6-inch Naylor Pipe, 40-ft. lengths, Victaulic coupled. Note bendability and flexibility of Naylor Pipe.

TONCAN COPPER

Naylor Pipe

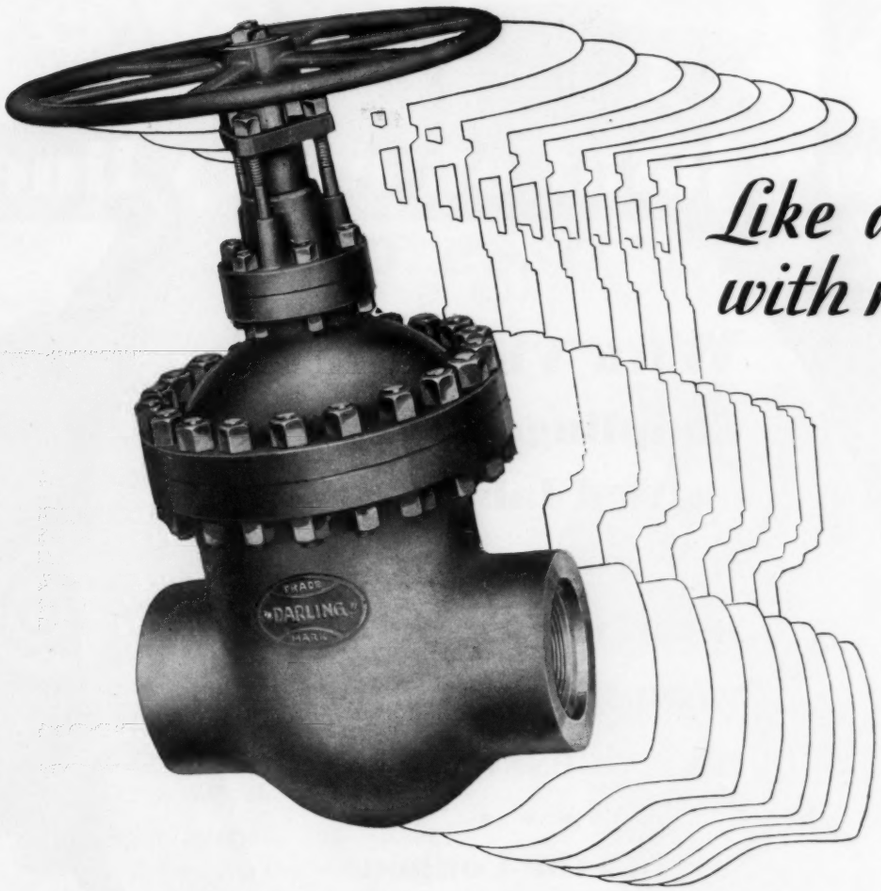
Maximum Structural Strength Mo-lyb-den-um With Minimum Weight

IRON

Standardized Naylor Pipe is made in sizes 6" to 12" I. D. and 14" to 20" O. D. in any uniform length desired up to 40' 0". Ends made to wrought pipe standards for all types of coupling.

Where corrosion is not a problem, Naylor Pipe can be furnished in steel.

Toncan Copper Molybdenum Iron possesses a superior corrosion resistance, making it the favored pipe material.

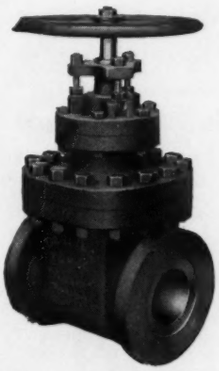


Like a cat with nine lives

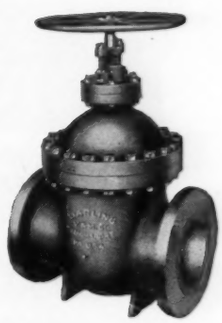
DARLING

GATE VALVES

When the Darling Valve is made—it is made skillfully and with the most flawless material—which means just this to you—you get a valve that will outlive your most optimistic expectations, a big saving in valve cost, in repair cost, and in production time.



Darval Semi-Steel Bronze Mounted Inside Screw Stationary Stem Flanged End Gate Valve. Dar-a-loy trimmed.



Darval Semi-Steel Flanged End Gate Valve, Dar-a-loy trimmed. Made in all sizes for general field use.

DARLING VALVE & MFG. CO.
Williamsport, Pa.

New York Oklahoma City Houston

"For every joint on every line"

With Victaulic Couplings . . . unskilled labor can lay . . . permanently leak-proof pipe lines . . . for any pressure.

• • •

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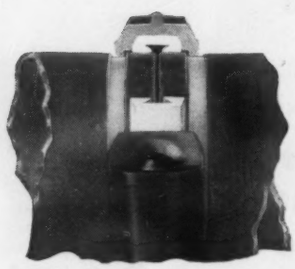
Victaulic Couplings are available for all sizes of—steel—wrought iron—cast iron and spiral weld pipe—any pressure. Mail the coupon for detailed information.

VICTAULIC COMPANY OF AMERICA
26 Broadway New York



"For every joint on every line"

FLEXIBLE LEAK-PROOF

VICTAULIC

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Please send me VICTAULIC BULLETIN No. 6

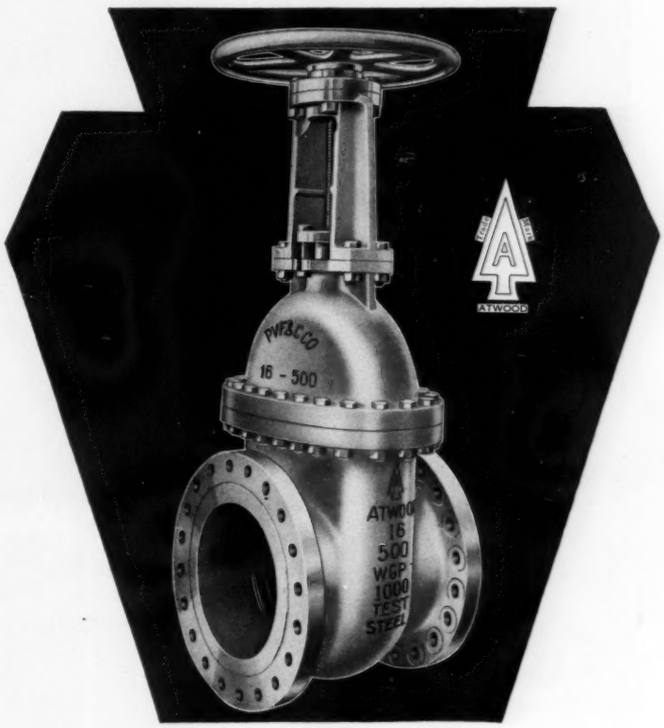
Name.....

Address.....

ATWOOD *Steel Valves Are More Efficient in Compressor Stations*

ONE of the leading gas companies called upon ATWOOD Service to help them overcome inefficiencies in valves on their Compressor Station lines. A valve, of ATWOOD Electric Alloy Steel and Bronze trim, as illustrated, was designed, manufactured and shipped in ten (10) days. But more important than the helpfulness and speed of ATWOOD Service, the valve fully answered the purpose for which it was designed—to the complete satisfaction of the customer.

This is but one of many cases on which this company has been called in and the problem solved. ATWOOD experience, facilities and wide range of products no doubt can meet any difficulty you are encountering and also afford you a quick and economical service for your day-to-day requirements in valves, piping and fittings.



16" ATWOOD Electric Alloy Steel, Bronze Mounted, 1000-lb. test, 500-lb. working pressure, Parallel Seat, Double Disc, O. S. & Y, Flanged Gas Gate Valve.

We shall be pleased to furnish further information.

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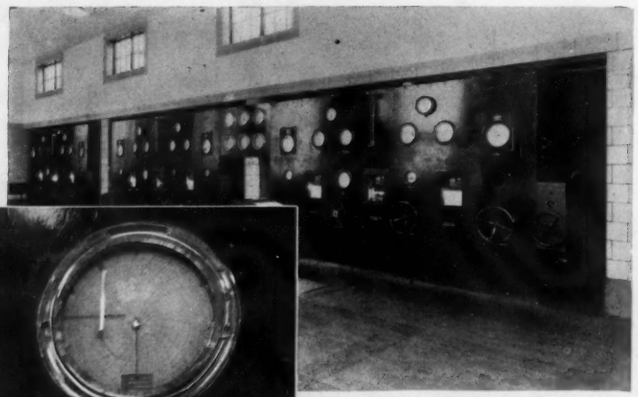

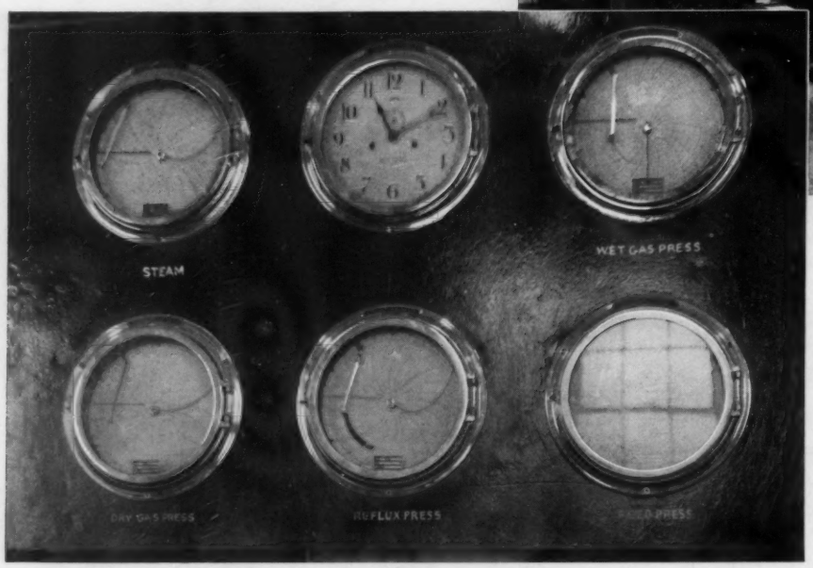

Above: Panel Board grouping of twenty-seven Bristol's Recorders.

At left: Close-up of central panel showing group of gauges. Also included is Bristol's Gaugeboard Clock.

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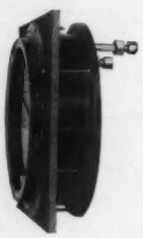

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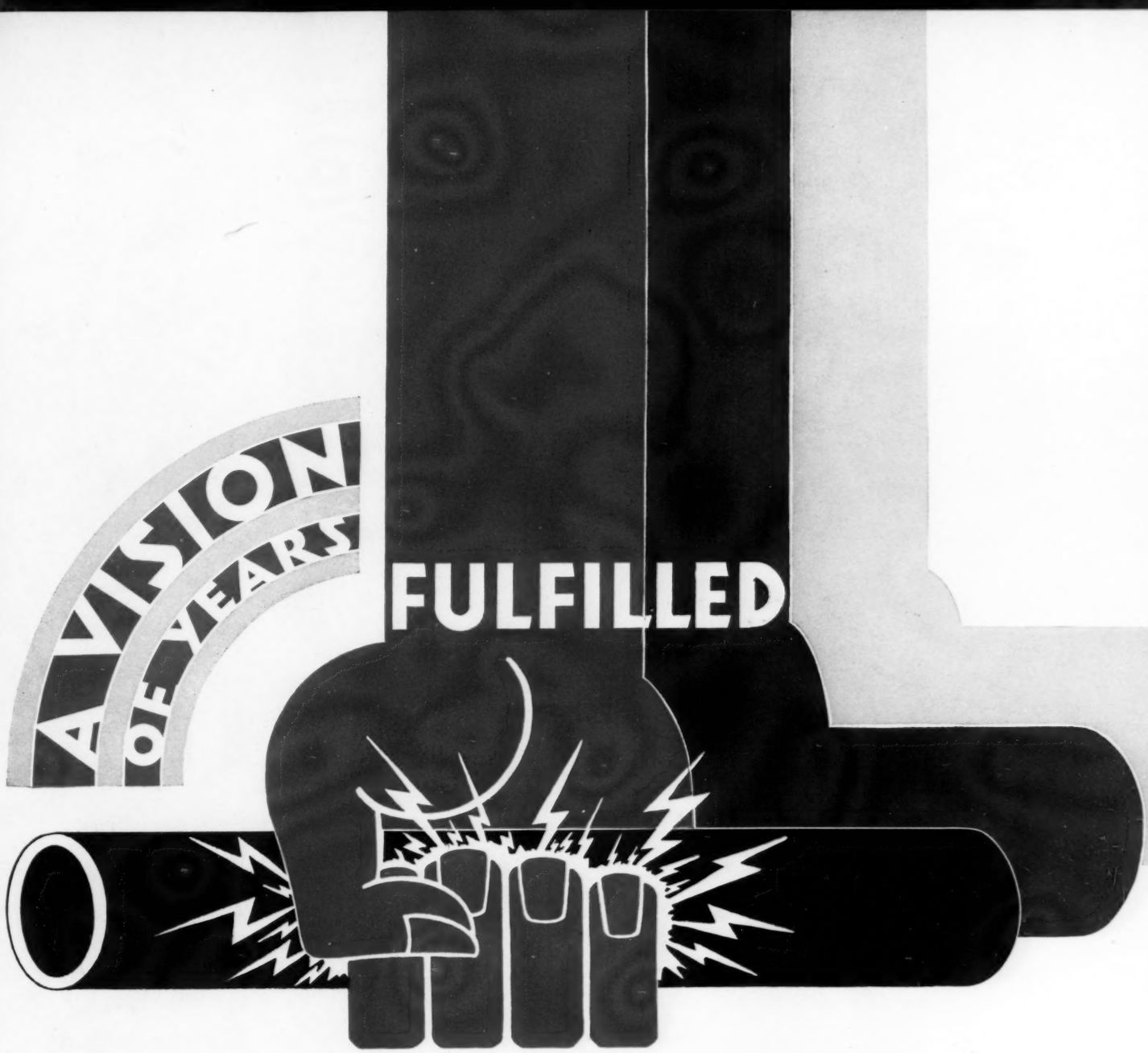

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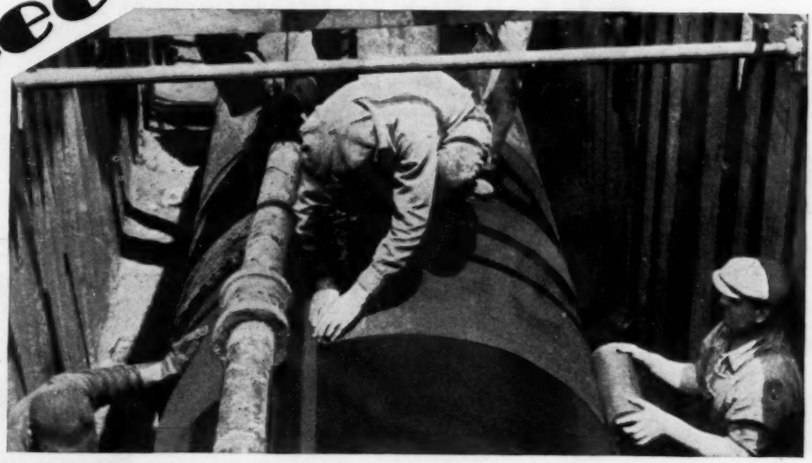

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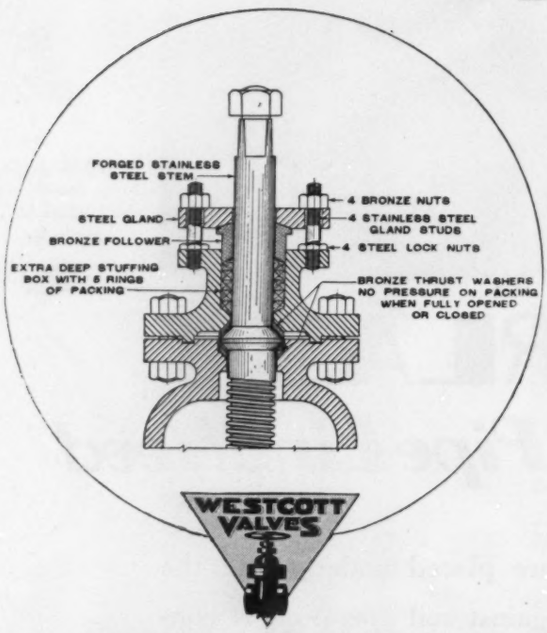
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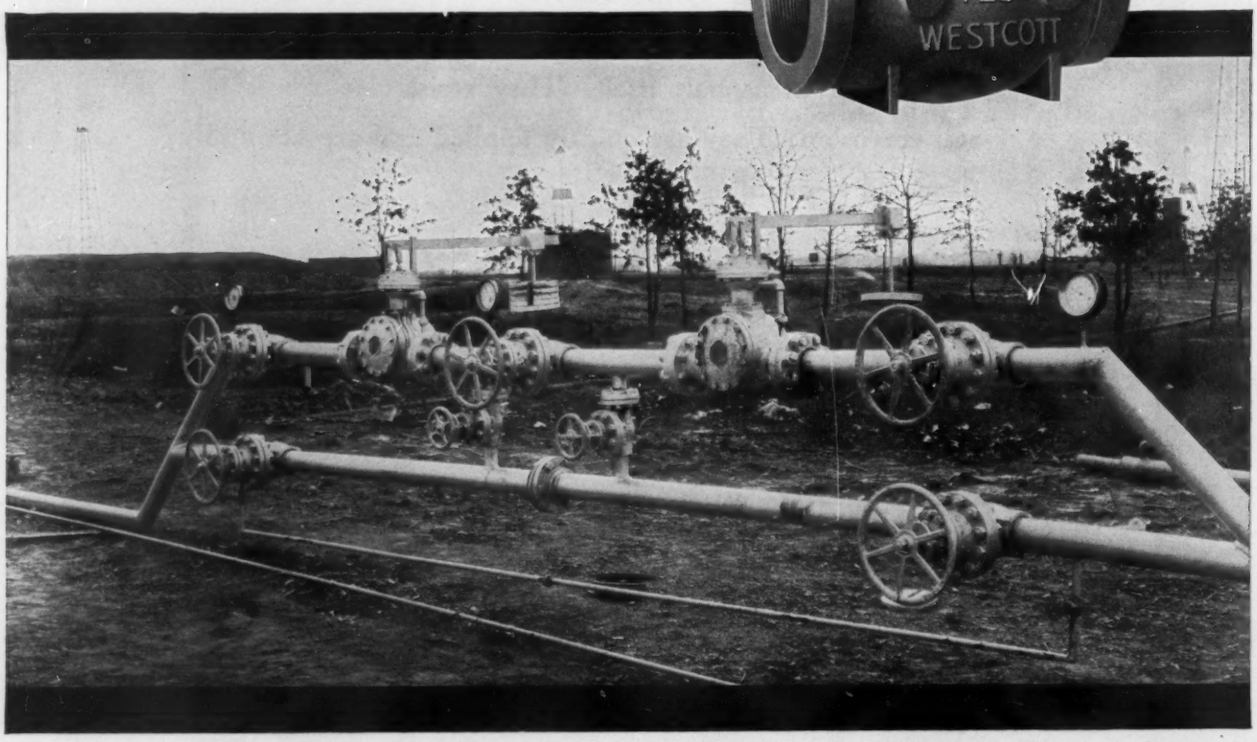

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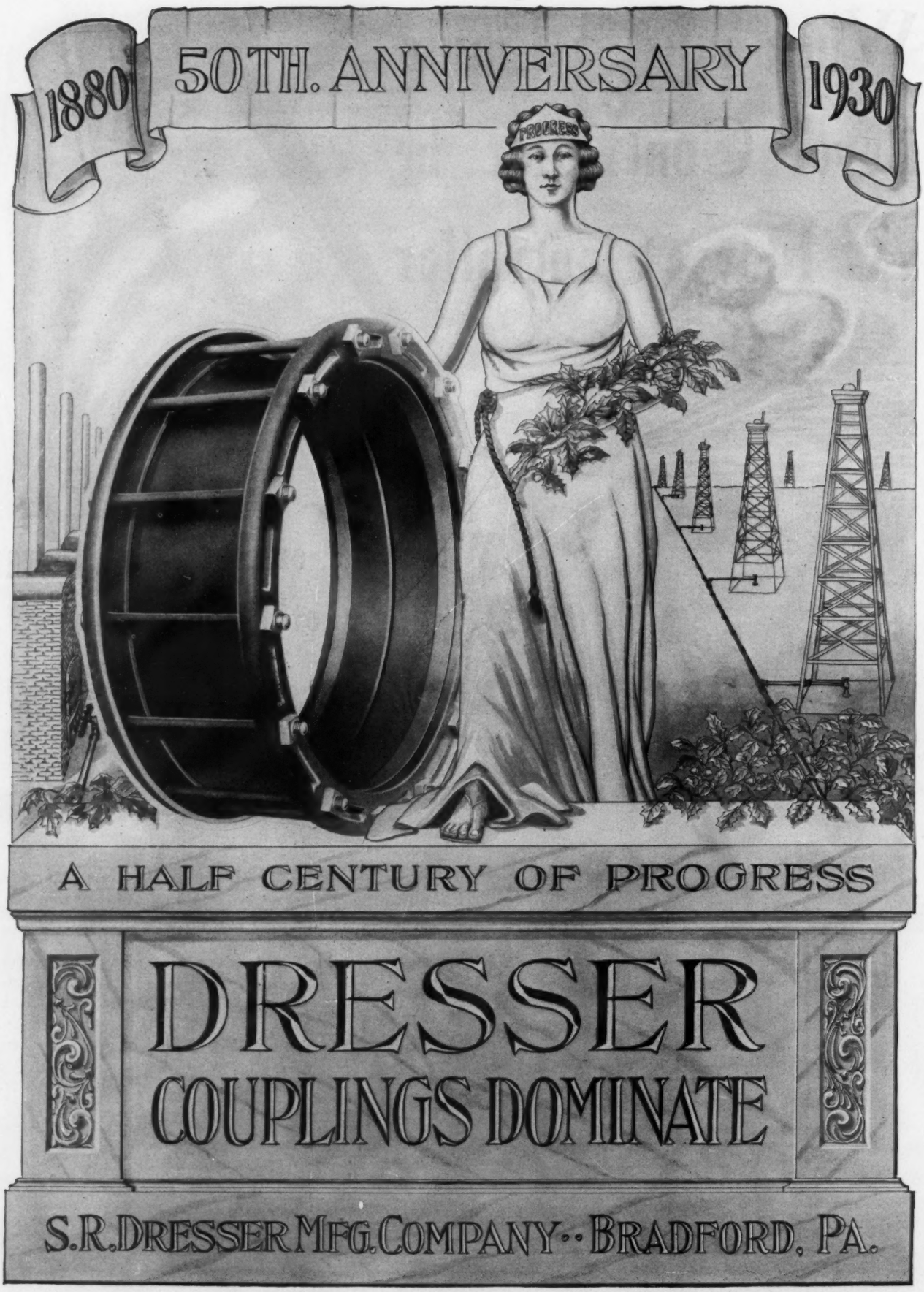
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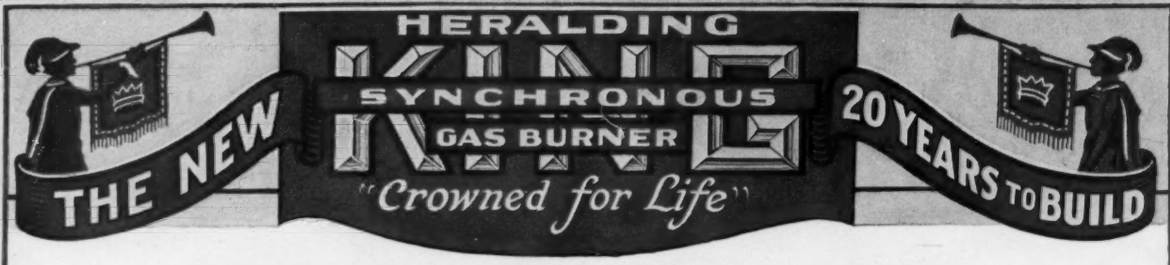

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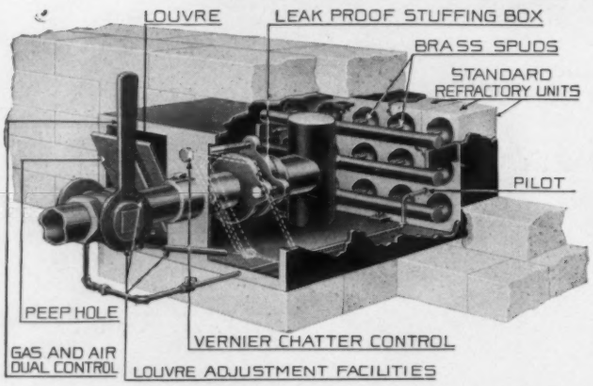

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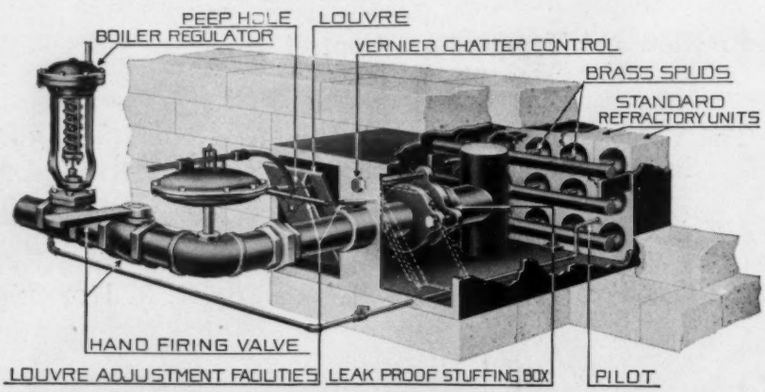

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SAN FRANCISCO **LOS ANGELES** **DALLAS**

Law *and* Economics Call *for the* Same Rate Forms

By F. C. HAMILTON

Valuation and Rate Engineer
Henry L. Doherty and Company

RATES which will meet the problems of growing investment in service facilities, and of the marginal consumer who does not return a profit to the gas utility, are widely hailed as a necessity, but even so the straight meter rate has not yet been completely discarded. Mr. Hamilton in his present discussion develops his subject both from the standpoint of the company and of the user who is discriminated against in obsolete rate forms. His paper was a feature of the Oklahoma Utilities Association's recent annual convention at Tulsa.—*Editor.*

F. C. Hamilton

THE law prohibits the enforcement by regulatory bodies of a rate that is not compensatory to the company, and since that law has been invoked almost invariably to stop the enforcement of a rate that was confiscatory of the company's property many people have overlooked the fact that it also prohibits the enforcement of a rate which may confiscate the property or property rights of the customer In only one case that I recall has this side of the question been presented.* It is my belief that the right to obtain service from a public utility at a rate which does not represent more than the actual cost of service plus a fair return on the property devoted to the service of the individual customer is a property right of each citizen. It is my belief that that property right is one which is valuable and one the possession of which can be defended by a citizen through the same legal procedure which the companies have used to defend themselves against the enforcement of a rate which they proved to be confiscatory of their property. As I say, this angle of the case has been presented but once, to my knowledge, but a rate which charges more than the cost of service and fair return certainly deprives the customer of one of two things which are of value to that customer; either money represented by the rate in excess of what he ought to be compelled to pay or, if he accepts the other alternative, a deprivation of that utility service.

The law next prohibits an "unjustly discriminatory rate," and the word "unjustly" should be carefully noted. To emphasize that statement in another manner I call attention to the fact that the law does not prohibit discrimination but prohibits "unjust discrimination." My reason for making this distinction will be apparent later because I shall attempt to prove that any and all rates must be to a greater or lesser extent discriminatory. So much for the legal side of the question.

The economic side of the question is this: Public utility companies are not organized and the money for their development is not provided from any altruistic motive. Money is furnished to public utility properties solely because of the hope that ultimately the money will be returned to the lender together with an earning on that money for the time during which it shall have been invested in the project. All hopes of a return on the money and an ultimate return of the money are based on two things that are not synonymous but are inter-dependent. One is a market for the utilization of the product to be manufactured and the second the rate at which the product can be utilized. It is obvious that the market can be eliminated entirely by raising the rate sufficiently high, and the market can be broadened by lowering the rate. It ought to be equally obvious that if the rate is lowered beyond a point where it is compensatory the project will fail, money for extension and for replacement of the existing facilities will be denied, and the source of supply will disappear. The economic rate, therefore, must be one low enough to attract customers and high enough to be compensatory.

Rate making has gone through the same stages of development as those recorded in any other science. Progress was made from time to time as the previ-

*U. S. Light & Heat Corporation *vs.* Niagara Falls Gas & Electric Light Company, *et al.*, in District Court of the United States, Western District of New York.

ous advances had been administered and tried out. And what were those steps?

First, we had in the early days of the gas business—(and it will be appreciated that those early days had to do with manufactured gas and not with natural gas)—a flat rate per month per customer, which was in some cases $10.00 per month per customer. Gas was used at that time only for lighting. The rate was applied to all customers whether they had three lights in a home or 40 lights in a hall. Obviously the cost of supplying 10,000 feet of gas to one customer per month, which I will admit would have been a very extraordinary customer in those days, and the cost of supplying 300 feet per month to some other customer, were widely at variance. The rate was in conflict with the law, but it was not this conflict which corrected the rate form. It was the fact that it was uneconomical from two directions. The company shortly found that it could not, with the then manufacturing methods, supply the 10,000 foot customer at $10.00 per month, and it found the customer who wanted 300 feet of gas would not buy it at $10.00 per month. The resulting economic pressure forced the invention, purchase and installation of gas meters.

Straight Meter Rate

With the gas meter came a rate diametrically opposite to the flat rate, which was the straight meter rate of so much per thousand cubic feet. We will assume for a minute (and I have seen bills that carried such rates) that the straight meter rate adopted was $2.75 per thousand cubic feet.

I am talking, of course, of the early days in the manufactured gas industry. The hall which used 10,000 feet of gas had its bill raised from $10.00 to $27.50, and in many cases would not continue to take service. The home which used 300 cubic feet had its bill lowered from $10.00 to 83c. The company began at the new rate to add new customers rapidly and very shortly had to consider the costs necessary to run a service to each new customer's home, install a meter, read the meter, render a bill, collect the account and service the customer. The company found that its holder costs were about $1.00 a thousand cubic feet as of that time; that the 300 feet of gas which that customer used cost 30c in the holder, with 53c left to cover the return on at least $35.00 of additional investment, the cost of bookkeeping, meter reading, and the return on this added investment, to say nothing of return on the plant and remaining distribution system investment. It was obvious then that the change in rate would promote only such a type of additional business as would involve a loss to the gas company for each added customer.

Some bright gentleman said, therefore, that there must be a certain minimum bill for each location at which service was supplied, and the next step in rate making consisted of changing the straight meter rate to a straight meter rate with a minimum bill. When the minimum bill was put into effect it made possible by obviating a portion of the loss from the small consumer the reducing of the straight meter rate, and for the purpose of this discussion we will assume a straight meter rate of $1.50 per thousand cubic feet was adopted, with a minimum bill of $1.00.

The natural development in the use of light and heat has always been an average added consumption per customer. This continued over many years. With the straight meter rate of $1.50 the 300 foot customer owed 45c, but because of the minimum bill, he paid $1.00. The 10,000 foot customer (and I am using two extremes) paid $15.00 as opposed to $27.50.

Each step in this as in every science was progressive, and only after the application of new methods could faults in turn be found in them. The adoption of the minimum bill as opposed to the straight meter rate was a step in the right direction, but very shortly it became apparent that there must be a distinction between the man who used 100 feet and paid $1.00 and the man who used 600 feet and still paid $1.00, because it was perfectly obvious that the meter and service which ran to each of these two customers as well as to the hall which used 10,000 feet were practically identical as to investment on the part of the company. It was obvious that it took no longer for a man to read the meter, turn in the meter reading, no longer for the bookkeeper to post and make out the bill, and that it took the same amount of postage to carry the bills to each customer.

Costs Segregated

Then came the next step, which was an attempt to segregate all costs having to do with service of the customer into two general divisions: First—Those costs which a gas company has (and this applies equally to manufactured and natural gas) which are proportionate to the number of customers on its lines; and second—those costs which bear no relation to the number of customers on the line but which are directly proportional to the amount of gas which those customers, irrespective of number, consume.

The next step in rate making (as a result of this analysis) evolved a rate which carried a customer charge which more or less approximated the cost of meter reading, bookkeeping and return on a portion of the investment, such as service and meters, as one item to be paid by all customers alike, and a charge for gas which was the same per thousand cubic feet to all customers, but which when so applied changed that portion of the bill covering gas delivered in direct proportion as the customer created or failed to create costs by demanding that service.

Little Rate Litigation

From time to time during all these progressive steps the only rate litigation before courts came from companies where city councils, commissions and other regulatory bodies had prescribed rates against which the company could allege confiscation, and as a result prevented the enforcement of such rate orders. During the same period and under the same rates where the company successfully prosecuted suits to prevent confiscation, I believe individual customers could have brought and proved a case against confiscation of their property or property rights. This would have necessitated a study on the part of the customer which would have divulged the real facts, which were that the customer using a large amount of gas under the straight meter rate was paying for his consumption sufficient to cover the deficit of many other customers who, because of their small consumption, did not pay the company sufficient to cover those customer costs and the cost of the gas. I believe it was unfortunate for the gas company that such suits were not brought. I believe that bringing of such suits would have compelled a more careful consideration of the whole subject of rates and would have removed the onus of federal court proceedings that now attaches to the company. The customers who really used our gas service through the straight meter rate had a portion of their property confiscated by an unjust rate schedule and had they appreciated the situation could have had that corrected through federal court proceedings as readily as the company had confiscatory rates enjoined.

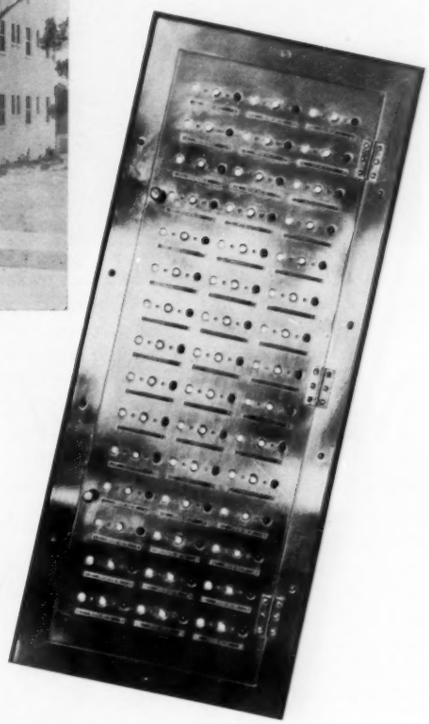
A straight meter rate necessarily must be confiscatory in so far as regards customers who really use service for the benefit of customers who use service as only a convenience and who cannot and do not under a straight meter rate pay the actual costs created by reason of their being connected to the lines of the company.

(Continued on Page 52)

AT LEFT:
El Patio Hotel, Ventura, Calif.—gas heated by individual furnaces in each room.

BELOW:
Master control board by which hotel clerk turns on and shuts off unit furnaces. Red and white signal lamps, designated by room number, indicate what range of fire is burning in each room.

See Page 11 for floor plan giving heating layout of El Patio Hotel.



45 unit furnaces save this hotel's gas bill

By FRED G. MERKER

District Manager, Southern Counties Gas Company, Ventura, California.

IN the erection of modern hotels, whether they be large or small, the utmost in modern living requirements commensurate with the rate charged must be anticipated to meet the exacting demands of a very particular public. Having the advantage of previous experience in hotel management, Mrs. M. Jennings thoroughly investigated every item in appointment and utility, affecting modern living conditions, before building the El Patio at Ventura, California.

Fred G. Merker

In her quest for the proper heating, she called upon the Southern Counties Gas Company at Ventura. In turning over the problem to the gas company she made the reservation that local open fire heaters would not be considered, for as she explained it, due to the lack of a central control the local heater of this type was in most instances burning longer when the room was unoccupied than during actual occupancy, thereby causing needlessly high gas bills.

While this sounded logical to the gas company, it presented a sizable problem. A central steam plant was too expensive; also, the cost of basements for basement furnaces was out of the question, for the building covered too much ground. So it resolved itself into something that wasn't being done.

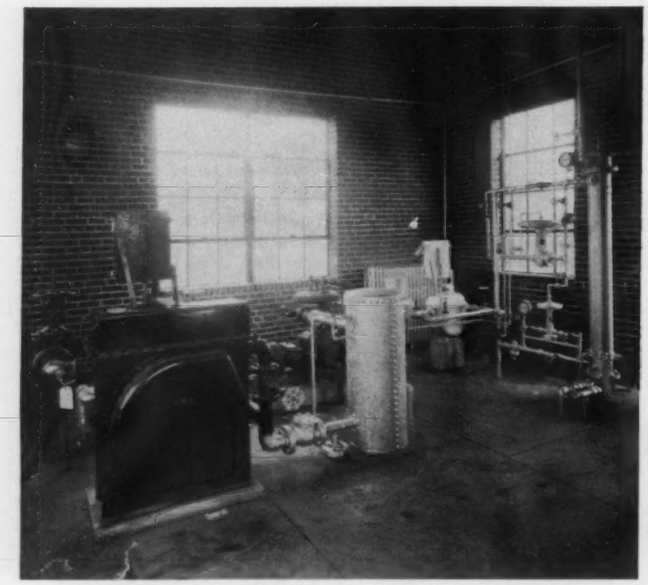
A thorough analysis of heating requirements and the economic expectancy was made by the engineering department of the Payne Furnace and Supply Company, and it was determined that miniature furnaces, one for each room, could be installed, without a basement, by supports extending up from the furnace and fastened to the joists. The furnace was of special design; yet since 45 of them were required for this building they could be manufactured economically.

The furnace is designed so that the riser to the first or second floor is not directly over the heating element. This is done to keep the radiant heat from being projected into the register box, or riser, causing high temperatures.

The heating element of the furnace is constructed of 18-gage ingot iron and entirely welded, with a galvanized inner and outer casing separated by 1-inch air space, thus reducing the radiation loss through the casing to a minimum.

The standard installation of registers, risers, boots and heads is used throughout, with the exception that the valve or shutter was left out of the register, thereby removing the fire hazard which might result by the shutter being closed when the furnace was in operation. Fresh air for each furnace is available through openings around the foundation, constituting an ever-changing atmosphere, so essential for good ventilation.

The furnace hood is connected directly to the stack boot, eliminating practically all heat transmission losses, for any heat generated is delivered immediately into the room, constituting the most effective gravity installation that could be devised. (*Cont'd on Page 43*).



Two views of apparatus installed in butane gas plant at North Manchester, Indiana.

Mixing *and* Distributing Butane Gas

Plant Design; Costs and Revenues Analyzed on Basis of Experience at North Manchester, Indiana, Plant

By L. C. HEAVNER

Utilities Service, Inc.
Fort Wayne, Indiana

PREPARED for the Joint Production and Chemical Conference of the American Gas Association, which met at Cleveland, May 21-23, Mr. Heavner's paper treats a subject that has special importance to the western gas industry. Distribution of liquefied natural gas from central storage and mixing installations is progressing rapidly in the western area, several plants having begun service in recent months. *Western Gas* for May, 1930, carried a description of the plant at Moorpark, Calif., written by F. A. Hough. Material on properties of butane appearing in Mr. Hough's discussion is duplicated in Mr. Heavner's paper, and hence is omitted in the presentation below.—*Editor.*

EARLY in 1929, the attention of the executives of our company was attracted to the use of butane gas mixed with air as a source of supply for commercial gas in small cities and towns. Inasmuch as there was very little definite knowledge available relative to cost of plants of this type and their operating expense, they felt that it would be advisable for our company to install one of these plants complete in some town of approximately 5,000 inhabitants that heretofore had never been supplied with gas.

There were at this time just two butane plants, both operating in Indiana, and both being of the conversion type, i.e., the towns had previously been supplied with other gas. A survey of our territory was made and it was decided to install a plant in the town of North Manchester, Indiana.

It was felt that by installing a new plant here, with new mains, services and meters, that after one or two years' operation, the company would have sufficient data to know whether or not it was warranted in applying for franchises, and installing similar plants in many of the smaller towns located within the territory served by the company, and which are not now served with gas.

North Manchester is a town of approximately 3500 inhabitants, located in the center of the farming district and having within its corporate limits North Manchester College and several small industries; also, it is located about 16 miles from the end of one of our existing high pressure pipe lines, so that if this type of service should not prove successful or economical, the system could be connected with this transmission line and served with gas from another source.

After it had been definitely decided to locate the plant at North Manchester, specifications for a plant and distribution system of 120 M per day capacity were worked out, by the Engineering Department of the Utilities Service, Inc., in conjunction with the Gas Engineering Department of the Midland United Company and the Phillips Petroleum Company, and the final plans approved by all three.

All of this preliminary work took considerable thought and time; also, the delivery of some of the material was slow, and consequently the plant was not put into actual operation until the middle of December, 1929.

Plant

(1) A plot of ground consisting of 15,000 square feet, adjacent to the railroad and within the corporate limits of the city, was purchased, and a railroad siding installed.

(2) The plant proper consists of a brick building 24 feet by 20 feet, with tile roof, divided into two rooms; one room containing the generating apparatus, meters and compressors, and a smaller room, 7 feet 2 inches by 9 feet 4 inches, which houses all of the electrical control apparatus, gas testing apparatus, gas fired boiler for heating the building, and a water heater for furnishing hot water for vaporizing.

(3) A storage tank for butane, 40 feet long by 8 feet in diameter, having a capacity of 15,000 gallons.

(4) A high pressure gas storage tank built for 60 pounds pressure, 47 feet 6 inches long by 10 feet 3 inches in diameter, having a capacity of 18,000 cubic feet of gas from 50 to 5 pounds.

In laying out the buildings and tanks, allowances were made for future extensions, as shown in Fig. 1 and Fig. 2 on the attached sketches:

A butane-air gas plant for small town operation has quite a few advantages over the conventional gas plant; some of these advantages are:

1. Low initial investment costs.
2. Low over-head.
3. Low maintenance cost.
4. Low labor costs, as the plant is almost entirely automatic in operation and requires only one man part time.
5. Low distribution operating costs, as there are no gum-forming compounds, stoppages or condensation to take care of.
6. No purification necessary, as butane contains only five grains of organic sulphur per 1000 cubic feet.
7. Non-asphyxiating. Butane gas is also odorless, it being necessary to use a warning agent or stench to detect its presence—we are at present using Ethyl Mercaptan.

DETAIL OF BUTANE PLANT COST

Land and grading	$ 800.00
Railroad siding	1113.88
Building	3420.00
Gas generating apparatus and foundations	4429.54
8x6-inch compressor, motor and foundations	895.80
2 tanks, including foundations	4960.00
Heating system	450.00
Pipe and fittings	1350.00
Electric and water service	550.00
Labor	878.56
Miscellaneous	405.00
Total	$19,252.78

Operation

Butane is shipped, and received at the plant, as a liquid under approximately 30 pounds pressure in specially constructed tank cars known as Class 104-A. These cars are lagged with 4 inches of cork insulation, which is protected with a metal jacket, and are equipped with special unloading apparatus, such as eduction pipes, check valves, thermometer wells, and safety valves.

Several methods may be used for transferring the butane from the cars to the storage tanks—first, by the differential pressure method; second, by applying external heat and raising the vapor pressure; or, third, by gas pressure from the high pressure gas storage tank. The third method is in use at North Manchester.

The storage tanks are installed above ground, and built according to the A. S. M. E. Code for Unfired Pressure Vessels, and are equipped with the proper safety appliances.

From the storage tank the liquid is transferred to the vaporizer under pressure through a liquid regulator, the function of which is to maintain a constant reduced pressure of about 5 pounds to the vaporizer. The vaporizer is built the same as a multi-tubular condensor, the hot water or steam used for vaporization passing through the tubes and the butane liquid around the tubes. A small tank water heater will supply sufficient heat to completely vaporize the liquid, as the latent heat required per gallon of liquid is only 830 B.t.u.'s.

The butane gas leaving the vaporizer is maintained at a constant pressure of about 6 inches of water by means of a regulator located at its outlet. The gas then passes through a meter placed in the line to measure the volume of butane gas made, and to give a check on the

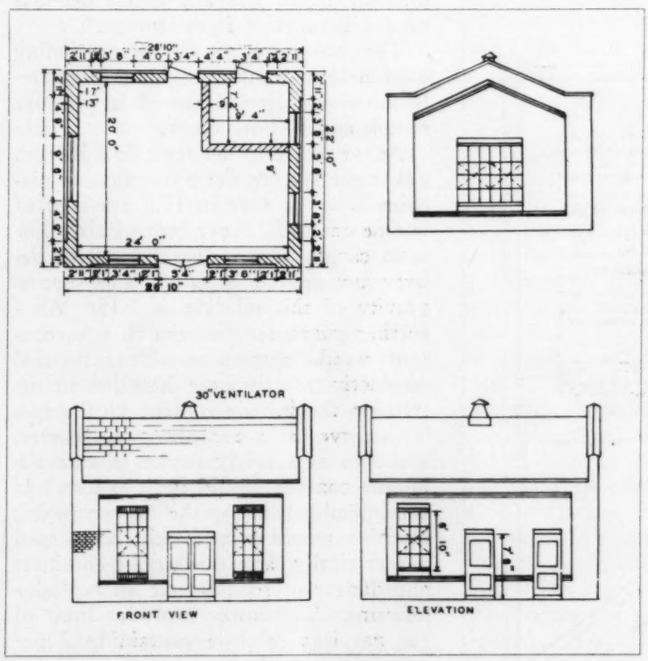


Fig. 1. Plan of building.

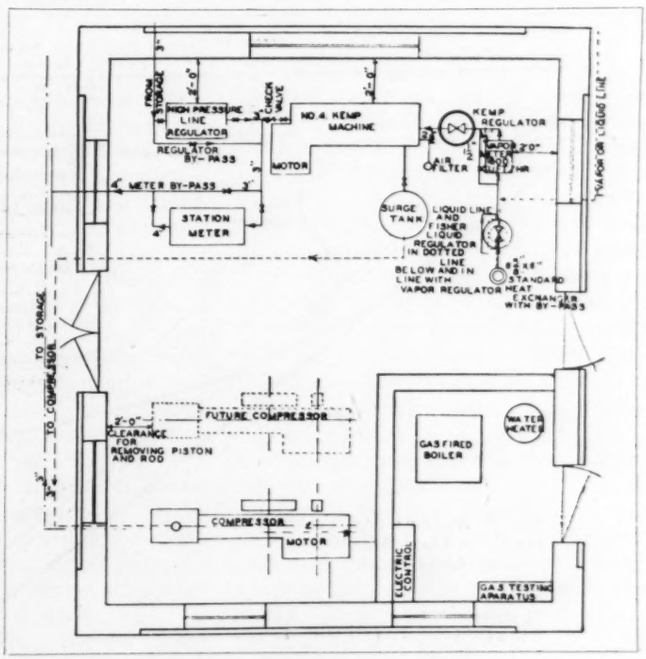


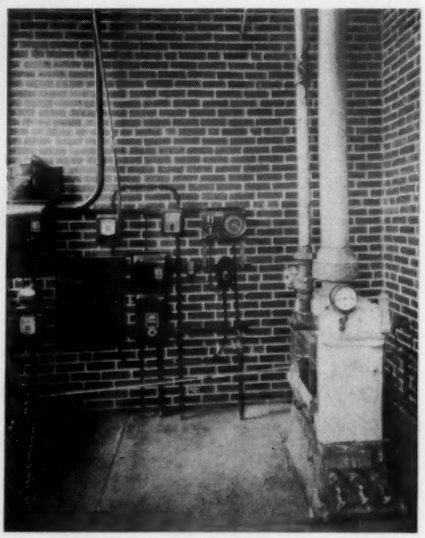
Fig. 2. Equipment layout.

AT LEFT:

Front view of North Manchester plant before landscaping.

BELOW:

Electrical controls and hot water boiler.



amount of liquid used. The storage tanks are also equipped with a gage so that a double check on the liquid is obtained. Any loss by leakage will thus be detected almost immediately. After leaving the meter, the gas again passes through another regulator ahead of the intake of the proportioning machine. This regulator is used to maintain atmospheric pressure at the intake of the proportioning machine.

The automatic proportioning or mixing machine used has a capacity of 6 M per hour and is manufactured by the Kemp Manufacturing Company of Baltimore. It is operated by a 3 H.P. motor. It mixes the air and gas in any desired proportion to supply a mixture of any desired calorific value. The ratio of air and gas can be controlled very easily by the operation of a proportioning valve. After the machine has been set at the desired ratio, it requires no further adjustment or attention. The discharge pressure of the proportioning machine is about 3 pounds.

The gas mixture, after leaving the proportioning machine, can go either into storage, or can be fed directly into the distribution system through a governor and station meter. The latter method, however, was not considered. If there should be an interruption of electric service, the proportioning machine would stop, and without a storage supply, the town would go out of gas.

A compressor, having a capacity of 5 M per hour, in conjunction with a high pressure storage tank, was installed, and during the off-peak hours gas is fed directly from the proportioning machine to the compressor, and thence at about 50 pounds pressure to the storage tank. During these hours the town is being supplied from the storage tank, through a governor.

During peak hours the gas goes directly from the proportioning machine into the town, and any excess demand needed is supplied from storage.

The operation of the proportioning machine and compressor is made entirely automatic by the use of a pressure switch and a Tork clock.

As we desire to deliver a 550 B. t. u. gas to the system, the proportioning machine is set to take in 17.2 per cent of butane gas to 82.8 per cent of air. The ratio can, of course, be changed to deliver any desired B. t. u. The specific gravity of this mixture is 1.15. As a further guarantee that the B. t. u. content would remain constant, thermal conductivity cells were installed to determine the butane content of the gas. This serves as a recording calorimeter, and also as a safety device in case the butane content should get too low. If this should happen, the proportioning machine would immediately be stopped automatically, and this would eliminate any danger of sending out an explosive mixture. The lower explosive limit of the gas is a mixture containing 2 per cent butane and the upper limit is 6.6

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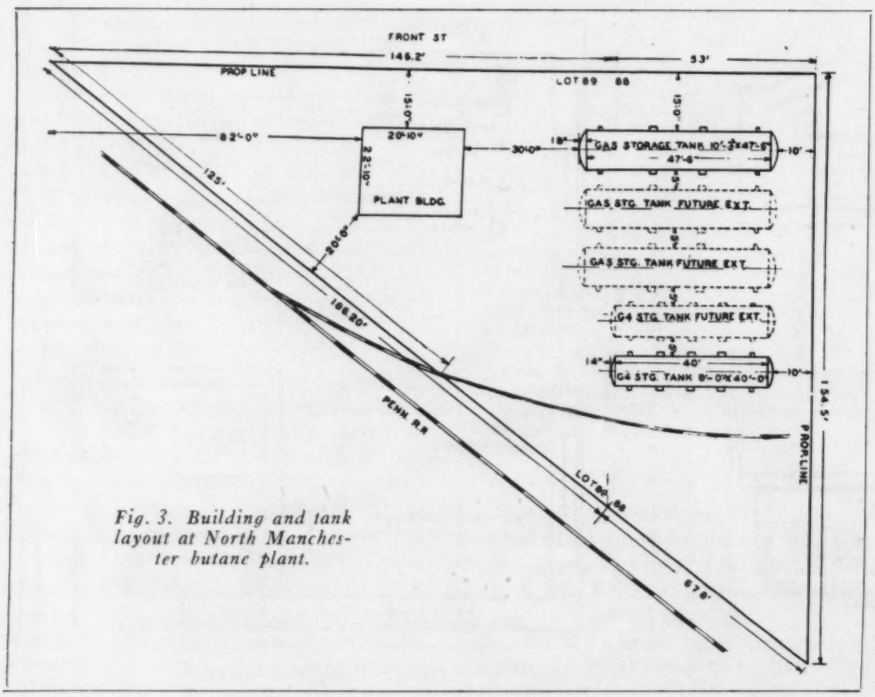

Fig. 3. Building and tank layout at North Manchester butane plant.

Modernizing Gas Service *in* Salem

Operating Problems in Remaking a Gas System

By J. G. REDDICK
Portland Gas & Coke Company

HOW the Portland Gas & Coke Company is putting the city of Salem, Oregon, on the gas map is the big news in Northwest gas circles. Mr. Reddick has gathered the story together in a paper for the program of the Pacific Coast Gas Association's Annual Northwest Conference, which met June 26-27 at Seattle. The high pressure line extension bringing oil gas from Portland to Salem was described by R. E. Cole of the Portland company in *Western Gas* for December, 1929. However, Mr. Reddick's paper contains some highly interesting sections on distribution problems, organization of labor schedules, load building efforts, and utilization work, not touched upon in the earlier article. Extracts from his discussion of these phases therefore appear below.—*Editor.*

SALEM, a city of 27,500 people, is located 52 miles south of Portland. A small coal gas plant located here supplied 1166 customers with 500 B.t.u. coal gas, selling at $2.00 per M. The distribution system covered about one-third the area of the city, principally the downtown and old residential sections. The same company furnished both electricity and gas to the town, and as the gas end of the business was not profitable the company had allowed it to suffer to the benefit of the electrical business. Oil gas of 570 B.t.u. was being manufactured at Portland 52 miles distant, and sold at an average price of about $1.20 per M. One major problem which presented itself to the Portland Gas & Coke Company in purchasing the Salem gas plant and supplying gas from Portland, was that of securing additional business throughout the unserved sections of Salem and towns enroute.

MARKET SURVEY

The initial step involved a survey of the existing and potential business to be secured by such an extension. Potential business was secured by a field survey, spotting on maps the houses and industrial establishments not served by the existing mains, both in Salem and in the towns enroute.

Past experience had indicated that 60 per cent of the houses passed by commercial extensions were secured as gas customers, and in view of possible investment already in electrical equipment throughout the territory in question, it was estimated that we could secure 50 per cent of the houses passed by new mains, with the proper amount of sales effort and price inducement.

Previous demand studies made on a 6-inch high pressure main supplying a town of 19,000 population, with the usual number of suburban customers, indicated a maximum hourly demand of 13.4 cubic feet per hour per customer, and owing to the similarity in the two situations this figure was used as the demand for the Salem extension. As it was desirable to provide line capacity for some future growth, studies were made on other inter-urban extensions which indicated a growth of 8.3 per cent per year. At this rate the load should double in 12 years. Pressure calculations were then made for various size transmission lines to handle the present potential load and for what we considered would be the load 12 years hence—or twice the present potential load. Initial pressures were limited to 100 pounds, owing to use of present equipment, and a terminal pressure of 10 pounds was used as a safe operating minimum.

The investment in mains, services, meters and regulators in each town was then computed by laying out a tentative distribution system for each, and assuming 50 per cent of the houses passed as secured.

The total investment for the entire project was then computed under various transmission line sizes and a cost study made under the four-part cost plan, variable basis. These studies included consideration of high pressure storage, with line reduction, recompression enroute, and direct pumping from Portland. The result of these studies indicated an 8-inch main with a combination of all three methods as the most economical for the ultimate load, but with direct pumping without high pressure storage or recompression for the present load.

The method of laying out the Salem distribution system may be of interest.

As previously stated, about one-third the area of the city was served by a low pressure system, comprised of many long 2-inch and 1-inch mains and covering chiefly the downtown and old residential sections. The system lacked sufficient feeder mains to permit further expansion of the low pressure area without backing up to the plant with large feeder mains through the business section of the city. It was decided to lay a high pressure belt line completely around the existing low pressure area, feeding the low pressure system through three district governors, and serving the balance of the city with high pressure. The boundary of the low pressure area was established close to the existing 4-inch and 6-inch low pressure mains, and along natural geographical limits, in order that the boundaries could easily be distinguished in the field. The long 1-inch and 2-inch mains protruding into the high pressure area were cut off and converted over to high pressure by tying in to the belt line and installing regulators on the services. A considerable saving was effected by this operation, particularly in the South Salem District, where a continuance of low pressure service would have involved laying 1.5 miles of feeder main under concrete pavement and across a viaduct.

HIGH PRESSURE LAYOUT

The outer limits of the ultimate high pressure area to be served were established by a field inspection of all the roads radiating from the city. The limits established along these roads were arrived at after considering the number of houses, the soil, contour of the land, distance from the city and other items. This included consideration of towns and cities beyond Salem. During this field survey all potential users of large quantities of gas were located, including the various State institutions, hospitals, etc.

The outer limits of the ultimate territory to be served having been established, the high pressure area was then divided into two classes: (1) city and (2) rural territory. The rural territory was then split into districts adjacent to the principal roads radiating from the city, which roads might serve as routes for feeder mains. In order to arrive at a balance the routes for feeder mains were so selected that the area of the various road districts, as they were called, were very

nearly equal. The ultimate demand for each road district was then figured on an area basis, using 500 tracts to the square mile, 50 per cent of these to be secured as customers, with a demand of 9.9 feet per hour allowed per customer. In figuring the area of these districts deductions were made for swamp land, State-owned farm land and other territory unsuited to occupancy. Likewise, additions were made to the hourly demand for various State institutions, based on the estimated number of inmates 25 years hence, and other possible large consumers.

CITY AREA

The city area was divided into districts with a feeder main for each district, and the area calculated. The load and pressure drop in these districts was figured by using 3,348 lots to the square mile, 50 per cent secured and a demand of 13.4 feet per hour per customer. The load and pressure drop from each road district was then superimposed upon the corresponding city district and the initial pressure at the belt line determined. Pressure drop on these feeders was kept at a minimum in order to increase the capacity of the transmission line between Salem and Portland.

SCHEDULE OF OPERATIONS

Completion of the main line was scheduled for 60 days. It was not desirable to solicit applications in Salem more than 30 days before service could be rendered, and the interval during the construction of the main line was scheduled for a house-to-house canvass of the houses on the existing low pressure system. The portions of the town not directly served by existing mains was divided into eight geographical districts for sales solicitation and installation of mains and services; solicitation was arranged to precede installation of mains and services by three weeks. The most promising districts were solicited first. In the field survey previously mentioned three men in four days had spotted 4,100 houses off of the existing mains in Salem and had secured the house number, class of house and condition of the street. This information was transferred to a tracing 300 feet to the inch, so that it was possible to estimate the quantities of mains, services and meters governors and appliances in each geographical district and to furnish the sales department with maps showing the houses to be solicited. On the basis of securing 50 per cent of the houses passed, the volume of work in each district was then interpreted in man days and crew days and a tentative schedule worked out by districts for the sales department, supply bureau, distribution and utilization bureaus. Distribution was supplied under the following headings for this schedule:

LABOR BUDGET

Main and Service Construction:
- Footage and size
- Man days
- Total man days
- Crew
- Time

Sales Department:
- Houses solicited
- Meter applications
- Service applications
- Miscellaneous and jobbing orders
- Range orders
- Plate orders
- Water heater orders
- Man days
- Crew
- Time

Shop:
- Service orders
- Meter orders
- Range orders
- Plate orders
- Water heater orders
- Jobbing orders
- Man days
- Crew
- Time

Original field conditions may be summarized as follows:

Coal gas of 500 B.t.u. heat value and .59 specific gravity was being used, the gas containing a very considerable amount of coke dust, mains and services often being inadequate and sometimes partly stopped up with dust, scale and naphthalene. Appliances were old and usually in poor condition. Customers were accustomed to these conditions and usually unacquainted with high operating standards.

UTILIZATION WORK

With the introduction of Portland oil gas of 570 B.t.u. heat value, 0.40 specific gravity, some adjustment of appliances was anticipated. Under direction of our utilization bureau, tests were conducted to determine the effect of the change of gas with no change in appliances orifices. It was found that 19.3 per cent more gas would pass the orifice and that the heat value passing would be increased 21.8 per cent. A new range was correctly adjusted on Portland gas and then sent to Salem, connected up to Salem gas at the same pressure as the gas used in Portland and observations were taken of flame conditions. The range was then properly adjusted on Salem gas and returned to Portland where it was supplied with Portland gas at the same pressure and conditions again noted. These tests proved, as had been anticipated, that service adjustments on all appliances in use would be necessary, chiefly by reducing the size of the orifices.

Before the change in gas was made, arrangements were perfected to have a crew of service men properly equipped and ready to be dispatched to check up and adjust all appliance burners, by districts, as soon as the change over to Portland gas had been completed. A number of Portland service men were added to the Salem force for this work. Lists were made of the gas users and each man provided with the names on his particular route. Notations were made stating what was done at each call. Follow up calls were made on those not at home. If not at home at the time of the second call, a "not home" card was left stating the object of the call, and requesting the customer to telephone and make an appointment for a further call. In this way all customers' appliances were checked over and first-hand information obtained of service conditions at each location. This served as a personal introduction of the new company to each of its customers, and gave us an opportunity to explain our policies, lower rates, pick up chronic service conditions and secure prospects for additional business.

The adjustments found necessary were, in practically every case, a considerable cutting down of the orifice size and the adjustment of the air shutter to give proper combustion. In the case of fixed orifices, the orifices were usually peened down. The problems involved were all comparatively simple, as the great majority of the appliances in use were small open top ranges, hot plates and tank water heaters.

When we first began our work in Salem, we found that there were no appliance pilot lights in operation, the explanation being that they stopped up so fast that they could not be kept lighted. Due to our sales effort and the introduction of the better type of modern ranges numerous complaints of stoppage of pilot lights and even range cocks began to be received.

When first reported it was thought the stoppage was at the burner tips and might be due to a deposit formed during combustion. Iron carbonyl was known to produce such a condition. It was thought that the connecting up of many new services had caused the exposing of considerable new metal surface to the gas and this had resulted in the formation of the volatile iron carbonyl compound. However, tests for this compound in the gas gave negative results. Further reports kept coming in and it was finally determined the stoppage was taking place in the pilot light needle valve and burner cock openings instead of at the burner

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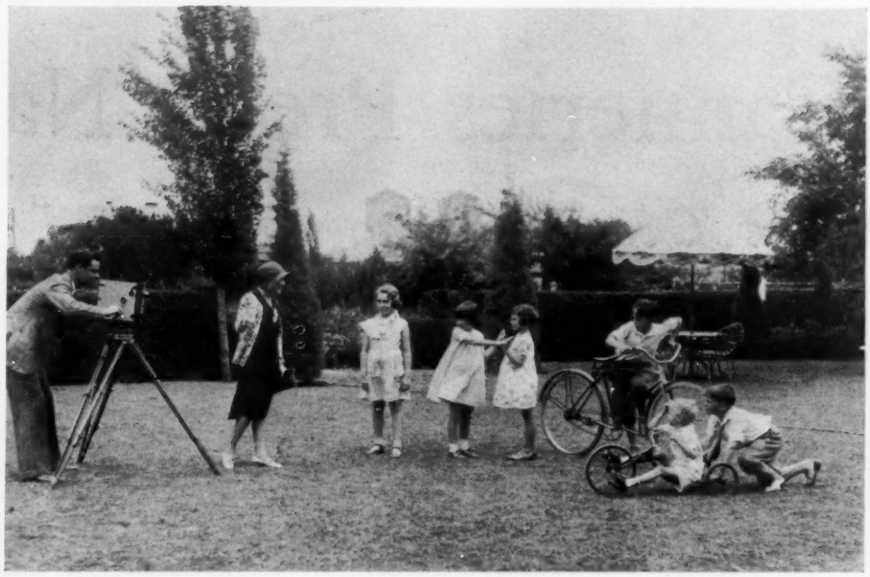

THESE young players are ready to romp through their scene in a Dallas Gas Company movie. A gas incinerator in the basement is really the hero of the piece. This garden play scene ran with the caption, "Keep your backyard as attractive as the front." Miss Upshaw directing.

Minute-Movies Catch *the* Eye *of* Tomorrow's Gas Users

Dallas Gas Company Stars the Home Town Juvenile Set in Films for Neighborhood Theatre Display

By LOIS UPSHAW
Advertising Manager, Dallas Gas Company

FOR that breezy bloc of self-assured, non-sentimental Americans, the high school set, which is such an inviting but difficult field for a gas company's advertising, we have found one method whereby to catch and hold the roving eye. It consists of a little one-minute movie reeled off in the neighborhood picture shows.

Lois Upshaw

For one thing, the members of this vivacious set go to the movies religiously. And what is more, they sit through the whole business and observe sharply every word and movement on the screen. The fathers and mothers who occasionally attend the shows with their children may find these advertising films an annoying superfluity, dragging out the program, but the youngsters intend to get their money's worth. They gaze steadfastly with eager curiosity, and miss nothing. They have no intention of buying gas equipment, for instance, but they take in every inch of a gas refrigerator film, and ponder every syllable of its proclaimed virtues. And we happen to know that these boys and girls will be married and buying refrigerators before long.

We have a feeling that sometimes these youthful audiences find the advertisements an improvement on the main picture. (You know they go to see any picture, regardless. This is the only reason the movie barons are barons, so far as we can see). The advertising films can often show an ingenuity and a *fait accompli* that the "Heart Throbbing Romance of the Golden West" lacks.

Also, the youngsters take a certain pride in seeing Dallas, its scenes, business and people on the screen. Now and then in the gas company's advertising they see their own friends and contemporaries as the players.

These little 50-foot films are designed to advertise the uses of Dallas gas, and how it increases the pleasantness of living in this city. And to give a variety and dramatic interest to the scene, the action takes in aviation, rainstorms, pretty girls and fireplaces, wash day, fried chicken, babies and puppy dogs.

In one film, the scene opened at a flying field, in a sport model airplane that took off and flew over town. Then the camera man and the director had to race back down town and climb aboard freight cars near the river, to photograph the plane circling the city. We showed our famous sparkling skyline without one fleck of soot.

The fried chicken came in a gas refrigerator drama that showed children trooping in from play to help themselves.

For a laundry dryer film, we had to spatter a garden hose above a window to imitate rain. Indoors, the negro laundress was washing the clothes that dried merrily in the gas-fired dryer.

A winter-time release showed how the social activities of the high school set centered around the gas fireplace. The plot was a "double date," where two boys, well known students in one large high school, calling on two girls from another high school, enter the living room with carefully studied nonchalance and wait in the traditional manner before the open fire, until the girls decide to come downstairs. The quartet chatters happily and eats candy by the firelight.

The film we have just made for the "corn cob and watermelon rind" season, to advertise gas incinerators, is a combination of drawings and moving pictures. An incinerator never takes a good picture, no matter how fine and new it is, so we used an attractive white and black sketch of an incinerator against black, with animated garbage hopping into it. One drawing showed a garbage can with a swarm of flies buzzing in and out, and another showed rain pelting down on a patient-faced

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Canneries Prefer Natural Gas

and Their Load Factor Helps to Balance the Sendout

K. B. Anderson

IN a little more than four months the Coast Counties Gas and Electric Company has converted its local canning industry to natural gas, since introduction of this adaptable fuel into the company's northern California territory. The author of this article discusses practical phases of the change-over from solid fuels to natural gas in several important canneries, following through from the advantages of natural gas which lend it attraction for cannery use, to methods of checking gas boiler installations for efficiencies.—*Editor.*

By K. B. ANDERSON

Industrial Gas Engineer,
Coast Counties Gas and Electric Company

EVERY year more than 30,000,000 cases of fruits and vegetables, representing a value of $100,000,000, leave California orchards and farms for consumption in every corner of the world. The canning industry has grown to be one of the State's major enterprises, and natural gas is assisting in promoting more extensive and economical operation of these canneries.

Heat is an all-important factor in this industry, as steam is used for cleaning the raw products, for water heating, for skinning, trimming, cooking and finally for sealing the cans.

Besides these many uses, great quantities of hot water and steam are used for the keeping of utensils, floors, equipment and wearing apparel of employees in the sanitary condition required in such operations.

This steam at about 100 pounds pressure must be generated in boilers of a size sufficient to care for the demand. The different raw products require different amounts of heat in the various stages of preparation, and so the heat must also be easily controlled.

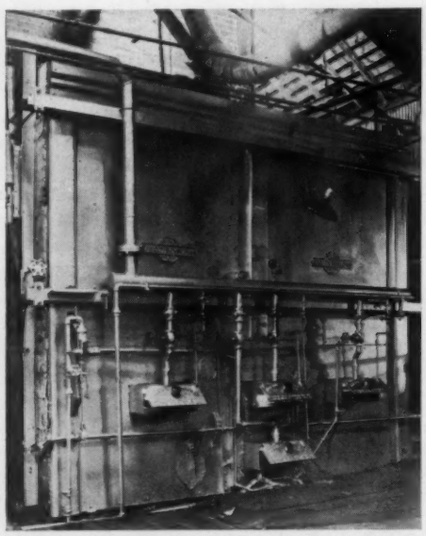
It is here that natural gas lends itself ideally to the situation—for the boilers can operate an entire season with no interruption and when necessary can be started and stopped with the turn of a valve. There is no necessity for vaporizing before the boilers can be started, and there is no fuel to burn out before they can be stopped—it is just as easy to start up after lying idle for six months as after an overnight shut-down.

Nor is it necessary to carry over a supply of fuel from one season to the other, or give up valuable space for storage. Neither does the consumer have to maintain and protect auxiliary equipment from deterioration during non-operating periods.

Deterioration is also less on the required equipment, because with natural gas there is no soot formation in the combustion, creating not only a fuel saving by avoiding loss of combustibles in the stack, but also a direct fuel saving due to the elimination of soot on the boiler tubes and flues.

Another saving is effected in maintenance expense, in that the flues and tubes do not have to be cleaned.

Straight natural gas lends itself very well to automatic regulation, enabling the engineer to take proper care of the boiler plant and at the same time leaving him free to take care of the innumerable small repair jobs which are always present in an industrial plant which embodies the intricacies of machinery found in the modern cannery.



300-h.p. water tube boiler in F. E. Booth Company plant at Pittsburgh, Calif.

There is always an abundant supply of gas at hand, enabling the consumer to care for unexpected heavy demands over either short or long periods of time, and an even steam pressure is assured, thereby contributing to the uniformity of the finished product.

Another feature of gas which is of material importance to the canning industry is that it arrives in the plant as a colorless fuel sealed in the pipes, and and leaves the boiler as a colorless, odorless, waste product. At no time can it come into direct contact with the employee, the equipment or the product. This means a saving of fuel, as well as more cleanly and more sanitary plant equipment.

SHUT-DOWN UNNECESSARY

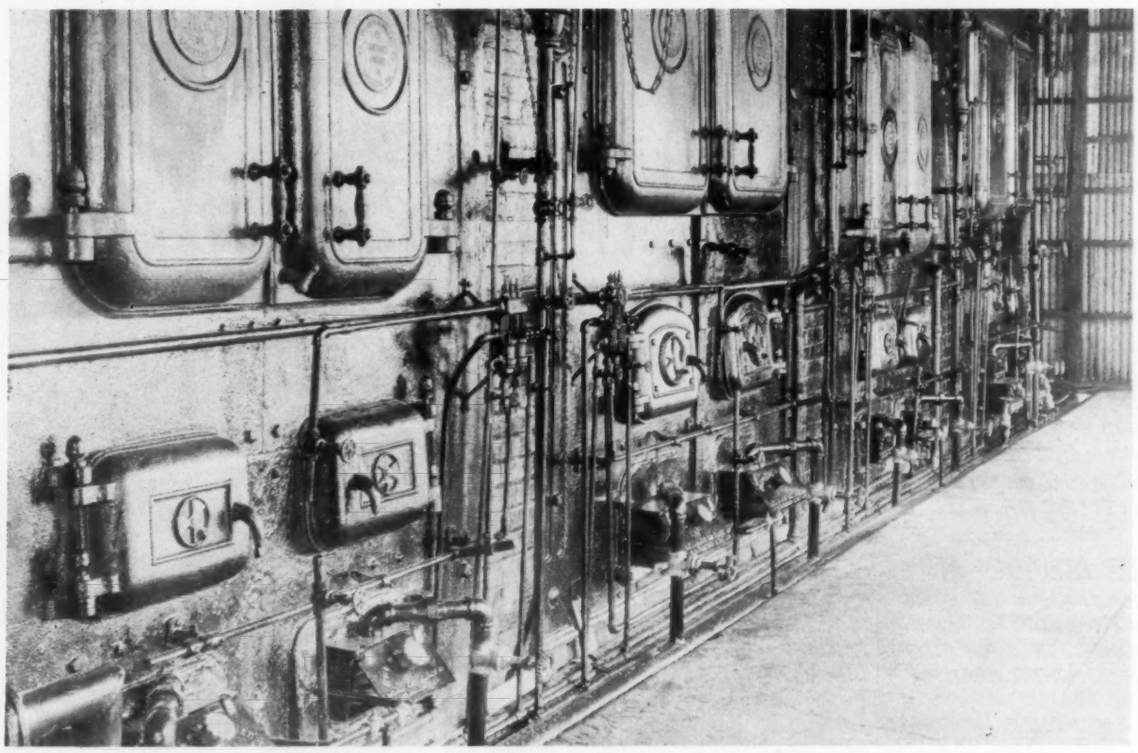
When gas is used as a fuel in a cannery, it is unnecessary to shut down during the operating season for repairs. Neither is a complete general overhauling of the plant required at the end of the season, which necessity is simply taken as a matter of course when other fuels are employed.

The canneries located in the territory served by the Coast Counties Gas and Electric Company have been quick to respond to the advantages available through the use of straight natural gas. Among the largest in the state is that of the F. E. Booth Company at Pittsburg, which has recently completed the change-over.

Although this company plans the installation of an entire new boiler plant within the very near future, investigation by plant officials revealed the fact that the application of straight natural gas to the old equipment would be of sufficient advantage to make this change-over for only a short time.

Because of the impending new plant, no effort was used to make a "show" job of this, but it is proving to be very efficient in operation.

The boilers used in the vegetable and fruit canning section of the plant are two horizontal return tubular ones and one large Erie vertical water tube boiler, while a 250 h.p. Scotch Marine double



Boiler installation showing method of connecting burners to header, and location of pilot lines. Oil burning equipment is still in place.

tube boiler is used in the fish canning department.

This company also employs considerable auxiliary equipment such as the by-products furnace and the fish cookers, which are direct-fired with natural gas.

The same type of burner is used throughout the whole plant, namely the NGE Type A burner in all except the small 80 h.p. horizontal return tubular boiler, where two NGE Type M boilers are used.

An overhead header and distribution lines were used exclusively throughout the plant and welding was resorted to for practically all of the joints, except where the fabrication required removable joints, and here flanges were installed. Each burner is equipped with double valves. Globe valves are used to regulate the flow of gas to each burner when under manual control, while the stop-cocks are installed in tandem with the valve to give positive shut-off when that particular piece of equipment is not in operation. This constitutes a safety precaution and prevents any possibility of leakage of gas into idle equipment.

All of the boilers are equipped with Wilgus valves which control the steam pressure on the boilers. This combination of equipment seems to give very satisfactory service.

The burners on the fish cookers will be equipped with automatic temperature controls.

Another cannery to be changed over is that of the Felice and Perelli Canning Company, where four boilers were in use, all horizontal return tubing, one being 200 h.p., another 150 h.p. and the other two 80 h.p., making a total of 510 h.p. for the plant.

However, it was the desire of the consumer to carry at least 800 h.p. A header was laid in the trench and all boilers are controlled through one Wilgus gas fuel regulator connected to the main steam header. By this arrangement any one or all of the boilers can be operated without changing the regulators.

In order to obtain the desired horsepower and at the same time balance the load proportionately among the different sized boilers, care was taken in the selection of the burners so that with all control valves wide open, each boiler would attain its rated capacity at the same pressure on the header. This was inaugurated within sufficiently close limits by the installation of two NGE type M burners in each of the 80 h.p. boilers and two type A burners in the 150 h.p. boiler, with two type A burners, surmounted by two type M burners in the 200 h.p. boiler.

All burners were installed in the lower or ash pit doors, without cutting the fronts, it merely being necessary to remove the grate bars from the front of the boiler and to level the floor so as to make a clean open combustion chamber throughout the boiler.

The metering of the gas was taken care of by two 500 B Metric meters at 10 pounds pressure, located in the boiler room near the end of the header. Safety precautions were followed by arranging shut off valves on the high pressure line to the gas regulator, both before and after the metering. By closing the high pressure shut-off valve, when the boilers are out of operation, no gas pressure is maintained in the pipes in the boiler room.

Under test the operation of this equipment is very satisfactory, the three sizes of boilers permitting an ideal combination for the various demands which are made in canning the different types of fruit and vegetables which are packed in this plant.

By this method it is unnecessary to operate any boiler at too heavy or too light a load, developing maximum efficiency. The pilots were installed, one for each burner, controlled by half-inch stop-cocks from a pilot header paralleling the main burner header and connected to the gas line ahead of the Wilgus steam regulator.

Two other smaller canneries which were among the first to see the advantage of straight natural gas for fuel were the Hollister and San Martin canneries, also located in the Southern Division of the Coast Counties Gas and Electric Company.

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There Is

No Royal Road *to* Sales

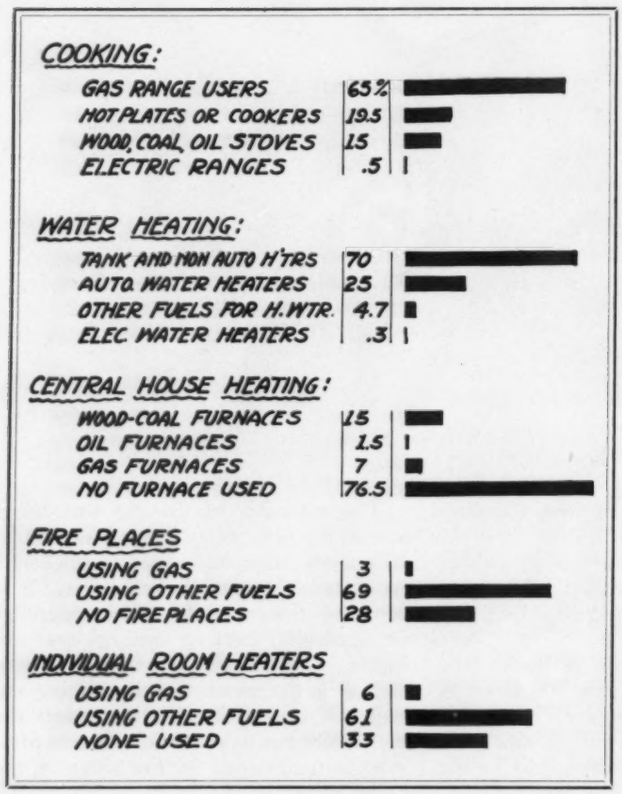

FIG. 1.

PRIOR TO introduction of natural gas throughout its system the Pacific Gas and Electric Company conducted surveys to determine the character of the domestic load at certain points.

THE CHART at the left reproduces data on use of gas and competitive fuels, classified by appliances. Conditions reflected in these percentages obtained in communities such as Fresno, Salinas and San Jose, Calif., before the changeover to natural gas. Apartment houses were excluded for the purpose of forming the percentages in this chart.

By R. E. FISHER

Vice-President in Charge of Sales and Public Relations
Pacific Gas and Electric Company

R. E. Fisher

WHETHER a business be large or small, whether it makes automobiles or shoes, or whether it produces electricity, natural gas or manufactured gas, it still remains true that its paramount problem today is the selling of its product.

During the past quarter century the executive brains of American industry were largely concentrated on the development of factories and machines with which to achieve mass production of commodities to supply a market which appeared to be boundless. The methods of production developed have made American industry the envy of the world, but at the same time have flooded the markets with such vast array of commodities and in such quantities that sales methods and policies have had to be completely revised.

The gas industry is no exception to the rule. In many sections of the West we are at present flooded with both oil and natural gas, competing with one another for business in which electricity, coal and wood also demand a share.

The sale, at a profit, of our entire production capacity is the goal toward which every sales department should strive.

This is, of course, easy to say but difficult to achieve. To accomplish it we must enlist the aid of the statistician to study the trend of our present markets; of the engineer and inventor to devise new markets; of the rate expert to set prices which will meet competition and still yield a profit; and of the manufacturer to give us appliances which will render a satisfactory service. This job cannot be done by bally-ho—it must be done by a careful analysis of existing and prospective markets and by equipping ourselves to supply these markets in a better way than can be done by anyone else.

The first step is a study of existing markets. Are these being served with satisfaction to the customer? Are they being served profitably? How profitably? Is competition gaining? Can the market be expanded? What would be the volume of sales if all this class of business were secured? What would it cost to secure it? How about its load factor? Knowledge of these things is essential to an intelligent sales policy, but very few sales managers can answer even one of them with confidence that he is correct.

A similar investigation should be made of new markets, with particular stress on the cost to secure them and the rate necessary to keep them. Selling should of course always be concentrated on the most profitable outlet, bearing in mind that a load which fills up a valley and improves plant load factor can be served at a less cost than one that comes on top of existing peaks. In looking for new business we should feel that our market includes every process which uses heat.

Securing this information is not the only essential to an intelligent sales job. We must use it and we must keep it up to date. Industry is constantly changing and we must change with it. The facts today may show that we cannot serve a prospect with profit to ourselves and satisfaction to the customer, so we leave him alone under the excellent economic theory that a deal must give mutual satisfaction if it is to stick. We should not forget this prospect, however, for the facts may change tomorrow and give us an opportunity to be of service.

An important axiom to bear in mind is that the sale of gas must always be

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PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California
A Department Conducted by Clifford Johnstone, Managing Director

First Shot Is Fired in Convention Publicity Barrage

"GOOD morning, Mr. Chairman." At this salutation, Oscar L. Moore, general chairman for the 1930 convention of the P. C. G. A., swung around in his chair with an inquiring look.

"Ah there," he smiled, "Come in and sit down, Mr. Chairman. Have a cigar, have a drink of ice water, won't you have lunch with me?"

Oscar L. Moore
General Chairman
1930 Convention

For he recognized his visitor as the chairman of the convention publicity committee, and he knows—as who in public life does not know?—that everything depends upon publicity.

With this Masonic exchange of the amenities the two chairmen proceeded to get down to business. (The editor of *Western Gas* was an interested observer. As a fellow craftsman he watched the technique with which the publicity chairman developed the first advance story of the Pasadena meeting from the man who is in charge of everything.)

"Tell me again, Oscar, what are the dates of the Pasadena meeting"—and the reportorial pencil came into full view.

"September 9th to 13th at the Hotel Huntington," answered Moore.

"Who is going to be there?"

"All of the high lights and most of the lesser luminaries from Vancouver to San Diego," responded Moore.

"What is going to bring 'em?" continued the publicity chairman.

"The finest and best and most instructive program that we have ever had at a Pacific Coast Gas Association convention," proudly answered the General Chairman.

"Ah Ha! You're going to make 'em work at the convention this year, are you?" asked Thurber, the publicity chairman, evidently pleased that others besides the publicity and advertising men would put in long, though pleasing, hours absorbing information at the convention.

"You bet. But there'll be plenty of play-times, too," was Moore's reply. "The program this year will be full of meat, it will be replete with brass-tack information, it will shine with all the radiance of . . . ." but Moore was interrupted here by a telephone call. This gave the publicity chairman a brief moment in which he tried to unscramble the metaphor left hanging in mid-air by the threads of silver-tongued oratory which rolled so smoothly from the lips of the convention generalissimo.

"Who is going to furnish all the red meat and the brass tacks and the radiant glow of useful information?" horned in the publicity man when Moore had finished his phone talk and before he could swing back into his panegyric.

"Well," replied Moore, "President Bivens has appointed Dan Scott to be program chairman, thus creating a job not heretofore a part of the Pacific Coast Gas Association convention set-up. It is hoped to have not only the past presidents of the Pacific Coast Association with us, but also we are counting on representatives of the American Gas Association, so you see, Mr. Thurber, the program is being given special treatment to guarantee its high quality."

Mr. Thurber asked, "What are these gentlemen going to talk about?"

Moore answered, "They are going to emphasize the fact that gas is a very modern fuel and are going to bring to all who attend valuable information concerning the most recent developments of our industry."

Thurber: "You said that there would be plenty of play-time."

Moore: "Yes, but not planned to interfere with the serious consideration of the business of the Association."

Thurber: "I presume the niblic wielders will have the usual opportunity to keep in practice."

Moore: "Allow me to correct you, Mr. Thurber. They will have an unusual opportunity. The golf activities are in the hands of our Mr. W. M. Thompson, who is the best golf chairman in this part of the country. The ladies' golf is in the hands of Mrs. Wm. Moeller, Jr., and they are going to be very well cared for."

Thurber: "Not being any better golfer than you are, I wonder what plans are being made for fellows like us."

Moore: "There will be the stunts night, entertainment open to both gentlemen and ladies, one special luncheon at which the three-minute speaking contest will be held, and dancing every evening at the Huntington Hotel."

Thurber: "Will there be any entertainment for those ladies who do not golf?"

Moore: "There will. The ladies' committee is in charge of Mrs. Frank Bivens and it is only necessary to say in that regard that we who remember her former chairmanships can be assured that there will be no idle moments for the ladies who will be in attendance."

Thurber: "It begins to look, Moore, as though the entertainment is going to out-shine the business sessions."

Moore: "I am sorry that you have received that impression, Mr. Thurber, for it is desired by the officers of the Pacific Coast Gas Association to make this convention one of outstanding value for the industry. A trip to the convention will be very beneficial to anyone engaged in the gas business, whether with utility corporation, or otherwise. It is the plan to send the delegates back to their respective companies loaded with valuable information which may be put into practice to the benefit of their own organizations."

Thurber: "I believe that the officers of the Pacific Coast Gas Association have been wise in planning a convention which will be very business-like, for I am sure that when those in authority on the coast find that such a convention is planned they will gladly approve the attendance of great numbers of their employees. Thank you, Mr. Moore."

Display of Modern Gas Distribution Practice and Equipment

AS A feature on the program of the Technical Section, the Distribution Committee will present a display of modern distribution practice. This is to be an exhibit of all that is new and recent, and will be confined entirely to the distribution of gas.

The exhibit will be set up at the Pasadena plant of the Los Angeles Gas and Electric Corporation, where there is available plenty of yard room as well as space under cover. As much of the equipment on display as possible will be in actual operation.

W. M. Henderson, Chairman, Distribution Committee

All manufacturers and utilities, Classes A and B members of the Association have been extended an invitation to show off their latest and most modern equipment and appliances.

Reservations for space are being recorded at a rate that would indicate everybody has "gone modern."

The display is primarily arranged for the benefit of distribution men; nevertheless the exhibitor will enjoy the benefit that will result from demonstrating his products to the attendance at the convention.

Among the exhibits there will be mechanical pipe cleaners, pipe wrapping machines, pipe protection products, pipe joints and pipe, welding and cutting tools, including metal cutting with natural gas; radio pipe locators (this is a new development—an improvement over the present type); earth current meters; gas leak detectors, with demonstration of their respective merits; motor-operated concrete breaker—so new it's not as yet on the market; meters, regulators, governors, and gauges; trenching and boring apparatus; service connections.

This is the first show of its kind, so even the idea is modern. The promoters desire to include everything in the way of new equipment and practice. They solicit suggestions and request all interested to contribute by entering equipment of recent design, or methods that are modern in the practice of gas distribution.

Space will be allotted as entries are received. No charge will be made for exhibiting. Freight handling, and setting-up expense is to be borne by exhibitor. Labor and material will be available at cost.

Those who are interested in exhibiting may address requests for space to W. M. Henderson, Chairman Distribution Committee, 725 Channing Street, Los Angeles, Calif.

Rules Announced for Inter-Company Convention Advertising Contest

ONE of the innovations at the 1930 P.C.G.A. Convention will be an advertising contest among the member companies. The purpose is to stimulate the gas utility advertising men to still further increase the effectiveness of their work, and at the same time to increase the interest of all gas utility executives and other employees in the important subject of advertising. Rules governing the contest follow:

W. M. Thurber, Chairman, Advertising and Publicity

1—The display will be exhibited on easel frames which will be placed in the center of the lounges and lobby at the Hotel Huntington—convention headquarters.

2—All exhibits will be mounted on strawboard cards with an inside margin of 25 by 41 inches for the mounting of the display on each board.

3—Companies entering the exhibit will be limited to six cards under each of the following classifications: (Note—it is urged that each entry consist of two, four, or six cards for the purpose of convenient display.)

(a) Newspaper Display Advertising—Merchandise.

(b) Newspaper Display Advertising—Institutional.

(c) House Organs—company publications.

(d) Outdoor Advertising or direct-by-mail. (Note—either or both.)

4—Mounting for all exhibits will be supplied through the Los Angeles Sub-committee. All exhibits are to be mailed or shipped *un-mounted* to E. P. Ramsay, Advertising Manager, Los Angeles Gas and Electric Corporation (Secretary of the committee), 810 South Flower Street, Los Angeles, so that the material will be in his hands by August 15th, 1930.

5—On or before July 1st, contestants will advise Mr. Ramsay concerning the number of mounts they will require for each of the four classifications.

6—Newspaper proofs or tear-sheets, samples of direct-by-mail, copies of house organs, etc., entered by contestants for exhibit purposes are to be sent *flat* as indicated in Rule No. 4. Each group of exhibits to be accompanied by a sketch or lay-out showing the desired arrangement on the mounts. (Note—All displays will be mounted *horizontally.*)

7—The Committee of Judges will consist of three members to be selected as follows: The President of the Pasadena Advertising Club and the President of the Los Angeles Advertising Club, each will be asked to name one member of the Committee of Judges. These two members then will select a third member to complete the committee.

8—The scoring system by which the exhibits will be rated will be determined solely by the Committee of Judges.

9—Prizes will be awarded as follows by the Pacific Coast Gas Association:

(a) Silver Cup to the best display of Newspaper Advertising on Merchandise.

(b) Silver Cup to the best display of Newspaper Advertising—Institutional.

(c) Silver Cup to the best display of company house organs.

(d) Silver cup to the best display of direct-by-mail or outdoor advertising, either or both combined.

(e) Twenty-five Dollars in gold as a Sweepstakes Prize to the Advertising Manager or to the company employees making the best all-around exhibit in the opinion of the Committee of Judges.

A special Prize will be awarded to the woman, attending the convention, whose selection of the 10 best pieces of newspaper advertising in the general exhibit, most nearly coincides with a rating of the best 10 newspaper advertisements in the opinion of the Committee of Judges. Ballots for the conveniences of the women will be available during the first two days of the convention. Official ballot boxes will be provided at convenient points in the hotel. The balloting will be concluded at 10 o'clock on the evening of the second convention day.

Note: The cooperation of all member companies of the P.C.G.A. is respectfully urged in developing the many potential values in this exhibit. Observance of all the rules is urged upon the advertising managers.

130 at Seattle Meeting

-As *Western Gas* goes to press word arrives from Seattle that an enthusiastic group of 130 delegates is in attendance at the Annual Northwest Conference of the Association, which convened on June 26 for a two-day session.

New Members from Seattle

THE Pacific Coast Gas Association is pleased to announce 47 new members from the Seattle Gas Company. That company was out in force at the recent Conference held in Seattle. Below are listed the new members:

W. R. Alexander	Edwin Haviland
K. E. Arthur	Henry Heward
Fred Barnum	J. S. Holt
F. Belsey	Chris Jorgenson
A. F. Birkholz	D. H. Jorgenson
Percy Black	R. Z. Le Mont
H. A. Bottomley	R. A. Lucas
P. A. Brattain	Fred J. Marty
Ivan M. Bruce	J. H. McClelland
C. S. Clary	T. D. W. McVicar
A. L. Cole	S. C. Mohler
Hyrum Crofts	R. M. Nance
A. Doll	W. G. Oyler
Vernon Damm	W. Rodgers
Siboleth De Lancey	Ed Rossman
H. J. Doherty	Phill Scott
Harry John Dutton	G. C. Steffy
C. Farner	George Stuart
Ray C. Finch	J. H. Wallace
Tom Forham	H. J. Western
Norbert Fratt	N. B. Whittier
Frank E. French	Frank Winandy
M. N. Gibson	Wm. Wykes
J. Graham	

CONSTRUCTION OF KLAMATH FALLS BUTANE SYSTEM STARTED

Construction of a gas distribution system has been started for Klamath Falls, Oregon. The franchise in that town is owned by the Natural Gas Corporation of Oregon. A 10-inch main feeder line is being laid with smaller sizes down to service pipe for a system to carry butane gas to 3,000 consumers.

As Klamath Falls is the present terminus of the Great Northern Railroad, which has recently been given permission to extend its line in connection with the Western Pacific into San Francisco, it is expected that the town will show rapid growth. The butane plant will be constructed in a short time.

ELTING HENDERSON RETURNS FROM AIR TRIP EAST

Late in May Elting Henderson, assistant general superintendent of natural gas production and transmission for the Southern California Gas Company, returned to Los Angeles from a trip to Ottawa, Kansas. He was called to Ottawa by the illness of his father, who passed away early in June.

In the interest of looking into gas line construction methods Mr. Henderson made stops at Independence, Kan.; Tulsa, Oklahoma City and Bartlesville, Okla. His trip was made by airplane.

T. G. ARROWSMITH HAS AGENCY FOR PEERLESS HEATER CO.

T. G. Arrowsmith of San Francisco has recently taken over the Pacific Coast representation for the Peerless Heater Company of Boyerton, Pennsylvania, and the Selas Company of Philadelphia.

The Selas Co. is manufacturer of a line of motor driven gas mixers, burners, and other industrial equipment, and the Peerless Heater Co. makes gas-fired boilers.

CARLSBAD, CALIF., GETS SERVICE FROM OCEANSIDE PLANT

Carlsbad, Calif., is now receiving gas from the plant of the South Coast Gas Company at Oceanside, six miles distant.

Schafer *and* Moeller, So. Cal. Gas Co. V.-Presidents

AT a meeting held in June, the board of directors of the Southern California Gas Company elected F. J. Schafer and William Moeller, Jr., vice-presidents. Mr. Schafer was formerly general manager, and Mr. Moeller was manager of natural gas production and transmission. Mr. Schafer has been with the company ever since it started operation over 23 years ago, and Mr. Moeller for the past 16 years. Both have had an important part in the growth of the company, which today has nearly a quarter of a million customers.

F. J. Schafer *William Moeller, Jr.*

Mr. Schafer has been connected with the public utility interests of California for 35 years. Upon formation of the Southern California Gas Company, he accepted the position of assistant superintendent, and has been successively promoted to general superintendent, assistant general manager, general manager, and now vice-president. He is a past president and an active member of the Pacific Coast Gas Association, the National Association of Power Engineers, and the American Society of Engineers. He is also very active in committee work of the American Gas Association and the National Safety Council.

Mr. Moeller was born in New York State, and received his early education in the public schools of Mount Vernon, his birthplace. He attended the Stevens Preparatory School at Hoboken, New Jersey, and then entered the Stevens Institute of Technology. After receiving his engineering degree he was employed by The American Sugar Refining Company in New Jersey, the Buffalo and Susquehanna Railroad in Pennsylvania, and by the Kansas Natural Gas Company, operating in Kansas and Oklahoma. In 1914 he came to the Midway Gas Company, at that time affiliated with the Southern California Gas Company, as chief engineer. He later became assistant general manager of the Midway Gas Company, was then made general manager, and since the consolidation of the Midway and the Southern California Gas Companies he has been manager of natural gas production and transmission until his election as vice-president.

Mr. Moeller has been active as a director and committee chairman in the American Gas Association, and Pacific Coast Gas Association, and is a member of the American Society of Mechanical Engineers.

GASSY BILL TO BE GOOD-WILL CARRIER FOR PAC. PUB. SERV.

In order to establish personal contact with their consumers and to point out to them the possible economies of gas, the Coast Counties Gas and Electric Co., the Inland Empire Gas Co., and West Side Natural Gas Co., subsidiaries of Pacific Public Service, have appointed a contact and public relations man, Gassy Bill, to travel throughout the territory served by these utilities, spreading the message of the utility of gas and the desire of the companies to be of service to their consumers. Gassy Bill will also go to work soon for the Natural Gas Corporations of California, Oregon and Washington.

Gassy Bill's travels to the households each month will be made in the form of a four-page folder enclosed with the monthly gas bill. The two inside pages will have his talks to the housewife and the back page will carry the imprint of the local company.

SO. COUNTIES EXTENDS BUTANE SERVICE TO TWO COMMUNITIES

A butane plant is being erected by the Southern Counties Gas Company in Los Flores Canyon near Santa Monica, Calif., with a capacity sufficient to take care of 200 consumers. Several restaurants will be served from the installation, temporary butane equipment being in use for this load while construction progresses on the permanent plant.

At La Habra, six miles southeast of Whittier, Calif., the company is erecting another butane plant to serve several consumers in outlying territory. The town itself is already getting natural gas service from Southern Counties mains.

T. E. BARTLETT IS COMMERCIAL MGR. FOR NAT. GAS CORP.

Thomas E. Bartlett has recently been appointed commercial manager of the Natural Gas Corporation of California, Oregon and Washington, to have charge of the merchandizing activities of all three of these corporations. In every town in which the Natural Gas Corporation opens its butane service, an intensive merchandising campaign is planned. Mr. Bartlett came to San Francisco from Florida, where he was doing similar work for the Florida Power Corporation.

C. A. RENZ, GEN'L. FOREMAN OF L. A. CO.'S DISTRIBUTION DEPT.

C. A. Renz, an engineer in the gas distribution department of the Los Angeles Gas and Electric Corporation, Los Angeles, Calif., has been named general foreman of the department, taking over the duties of A. R. Bailey, who resigned last month to become affiliated with the Coast Counties Gas and Electric Company of Santa Cruz, Calif., as gas engineer.

ELROY PAYNE ATTENDS SESSION OF A.G.A. HOUSEHEATING COM.

Elroy Payne, general manager of the Payne Furnace and Supply Company of Beverly Hills, Calif., left Los Angeles about the middle of June to attend the meeting of the Central Househeating Committee of the American Gas Association held June 20 and 21 at Chicago, Ill. Mr. Payne is also stopping at points enroute to interview distributors of the company's line of equipment.

COAST INDUSTRIAL GAS CO. IS NEW STANDARD SUBSIDIARY

Announcement was made late in June of the organization of Coast Industrial Gas Company, subsidiary to the Standard Oil Company of California. No announcement has been made of the part that the new company will play in the operating set-up of the Standard organization, except that it will be connected with the company's natural gas interests.

Continental Construction Co. Builds Chicago Line

ANNOUNCEMENT released from the New York headquarters of Henry L. Doherty & Company on June 11, stated that with the formation of the Continental Construction Company, a Delaware Corporation, the actual construction of the $100,000,000 Texas-Chicago natural gas pipe line is now under way.

The Continental Construction Company will have charge of construction of the line and has established offices in the Professional Building in Kansas City. Bids on certain portions of this line were to be filed in the office of E. V. Kessinger of the company by June 10, with awards being made around the first of July.

The line is to be 1,000 miles in length, of 24-inch pipe. It is proposed to construct the carrier in two 500-mile units, and bids have been received on the first 500-mile unit only. Approximately 1,000 miles of smaller dimension pipe will go into the auxiliary and lateral lines with the entire project being completed before the close of summer of 1931.

Identified with the project are Cities Service, the Insull interests, Standard Oil of New Jersey, Texas Corporation, Skelly Oil Company, Phillips Petroleum Company and Columbian Carbon Company.

More than 50 cities and towns in Kansas, Nebraska, Iowa, Illinois, Indiana, Michigan and Wisconsin will be served by the line, with the Peoples Gas Light & Coke Company distributing the gas in Chicago, following the approval of this move by the proper authorities. It is thought that a mixed gas may be served at Chicago which will be the case in some of the other cities as well.

The Texhoma Company will supply the gas in the Panhandle fields. This company and associates control a proven gas acreage totaling approximately one million acres in Kansas, Oklahoma and Texas.

The Natural Gas Company of America, a Delaware corporation, has been formed to finance and operate the line. Funds for the construction and operation of the line are to be furnished by the various companies interested in the project. These companies are said to have combined assets of approximately $4,000,000,000.

Immediate construction is to begin on a number of gas compressor stations which will total 70,000 h.p. Additional units are to be constructed later, bringing the total to 100,000 h.p.

HOUSTON PIPE LINE ANNOUNCES CONSTRUCTION PROGRAM

E. H. BUCKNER, president of the Houston Pipe Line Company has announced a construction program to be begun by his company, the chief unit of which will be a 12-inch, 25½-mile auxiliary line from Refugio extending in a northeasterly direction to a point near Fannin, Goliad County, tying into an 18-inch line and a 12-inch auxiliary loop, both of which were completed through this district last year.

Frank W. Kirk, general manager of the company estimates that the new auxiliary which will lead out of the La Rosa compressor station will be completed in about six weeks time under normal conditions. The construction contract has been awarded to E. A. McPherson Construction Company of Dallas, which has already begun the laying of the line.

Multiple river crossings are to be provided at the two streams, the San Antonio River and the Sarco creek, which are to be crossed.

The Refugio-Fannin auxiliary will materially increase the capacity of the system, which last year had a daily average delivery of more than 100,000,000 cubic feet daily. Booster stations on the system are located at Edna, in Jackson County and at Refugio, Lucas and Bruni.

A 4-inch line, approximately 16 miles long is also being constructed by the company from Midfields south through Blessing and Palacios. This line is being constructed by the company's crews.

Natural Gas Prospects Brighten *for* Arizona

THE natural gas outlook for Arizona has continued to brighten during the month of June. The Western Gas Company of El Paso, Texas, has been organized to construct a pipe line from the Lea County fields in southeastern New Mexico to El Paso and on to cities of Arizona, including Bisbee, Douglas, Morenci and Clifton, and possibly Tucson and Phoenix. Paul Kayser is named as president of the company. Arizona news statements indicate that the new line will be approximately 900 miles in length and will be complete in the early months of 1931.

News dispatches from the East and from Arizona announce that the Phelps-Dodge Corporation has signed a long-term contract with the Western Gas Company for piping natural gas to its properties in the Clifton-Morenci and Douglas-Bisbee districts of Arizona, the contract covering fuel requirements for use in the company's smelters in those districts.

Arizona Edison Company, with headquarters in Phoenix, is reported to have signed a contract with the Western Gas Company for natural gas for domestic use in the Douglas and Bisbee districts. Applications for franchise rights in the district are also being filed by the Arizona Edison.

35-MILE, 16-INCH CARRIER TO BRING ELWOOD GAS SOUTH

A 35-mile, 16-inch welded line will be laid from a point near Goleta, Calif., south to Ventura, by the Southern Counties Gas Company. Pipe has already been ordered from the A. O. Smith Corporation, and construction is planned to begin late this summer. It is hoped that the line may be completed in time to be of service for the winter peaks. Goleta, the beginning point for the line, is located about six miles north of Santa Barbara, near the Elwood field from which the gas supply will be drawn. Approximately $600,000 will go into construction of the new carrier.

A. B. DAY NOW FIRST VICE-PRES. OF PAC. COAST ELECT. ASS'N.

Addison B. Day, president and general manager of the Los Angeles Gas and Electric Corporation, was made first vice-president of the Pacific Coast Electrical Association at the annual convention of that body held in June at San Francisco. Last year Mr. Day was second vice-president of the organization.

Harry L. Masser, vice-president and executive engineer of the same company, was made a member of the Executive Committee of the Electrical Association.

CONSUMERS GAS COMPANY TO EXERCISE FRANCHISE RIGHTS

Consumers Gas Compny has been authorized by the California Railroad Commission to exercise franchise rights in the cities of Los Banos and Gustine, California.

No. West States Utilities *is* Mountain Merger

CONSOLIDATION of northern and central Montana and Wyoming natural gas interests under the Northwest States Utilities Company has been announced by R. M. Heskett, vice-president of Minnesota Northern Power Company with headquarters in Minneapolis, Minn. Through this consolidation gas properties of several companies will come under the operation and control of the new organization. Following are the properties affected by the merger:

Montana Cities Gas Company, which owns and operates a natural gas transmission line from the Kevin-Sunburst fields to Great Falls, and sells gas wholesale to the Great Falls Gas Company.

The Northern Natural Gas Development Company, which owns or controls under contract to purchase gas, much of the supply of natural gas available in the Kevin-Sunburst field, and which supplies gas for the Montana Cities Gas Company line.

The Central Montana Utilities Company, representing a merger of the interests of Frank P. Book and the Minnesota-Northern Power Company, organized to serve Lewistown.

The Havre Natural Gas Company, a Minnesota-Northern holding, serving Havre and Chinook with natural gas.

The Pondera Utilities Company, also Minnesota-Northern owned, organized in 1929 and serving Conrad, Valier, and the Pondera oil field.

The Sheridan Gas and Fuel Company of Sheridan, Wyoming, has also been taken over by the new organization, as well as the natural gas franchise in Buffalo, Wyoming. Immediate construction of a 55-mile, 8-inch, line from Billy Creek, through Buffalo to Sheridan, is announced by the company. Gas will be purchased at Billy Creek from a producing company.

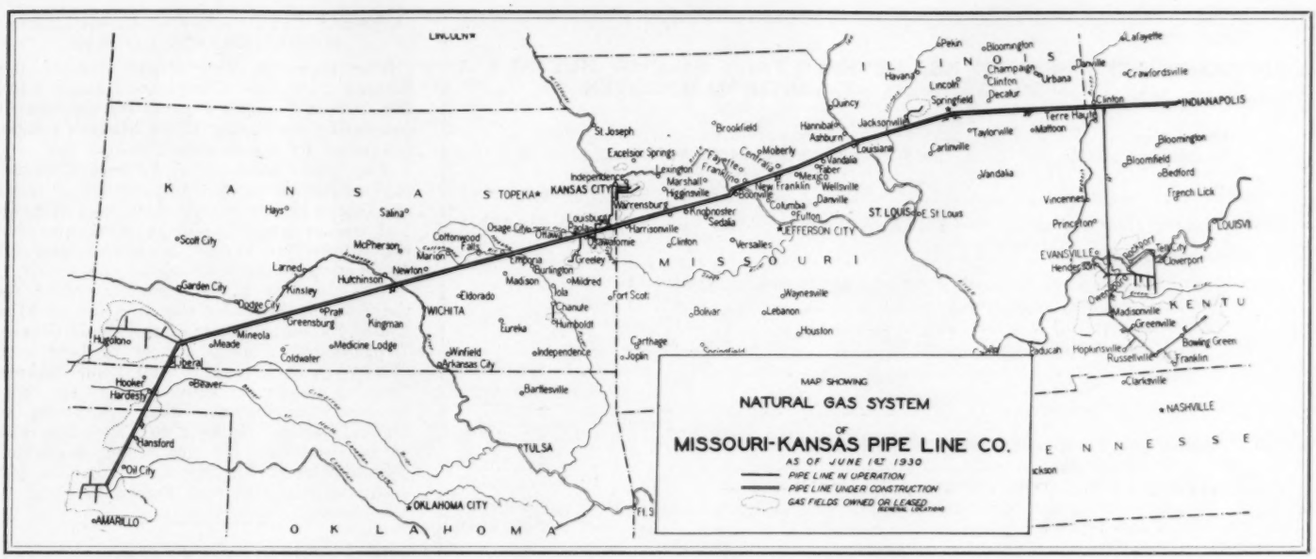
Active management of the Northwestern States Utilities Company will be taken over by the Minnesota Northern Power Company, and headquarters offices will be identical.

According to the Montana press, the first step in the expansion program of the new company will be the construction of a 40-mile, 10-inch line from the Kevin-Sunburst fields to the Sweet Grass Hills area near the Canadian border, which will connect two major Montana gas fields. Another project which will be in the plans of the enlarged company will be the construction of a natural gas line to serve Lewistown, this project having already been announced by the Central Montana Utilities Company.

ARKNATCO MOVES OFFICES AND STARTS NEW BUSINESS DEPT.

A New Business Department, with Collie B. Wilson as manager, has been announced by the Southern Cities Distributing Company, simultaneously with removal of the company's offices from the Slattery Building in Shreveport, to the Ardis Building, also occupied by the Arkansas Natural Gas Corporation.

All types of gas burning appliances will be on display in the company's new quarters, which are established on the first floor of the building, with the exception of the office of Paul F. McBride, general manager of the Southern Cities, which will be located on the second floor of the building. Frank S. Kelly, general superintendent of the company, W. J. McIntire, in charge of industrial development for the company, and C. B. Wilson, have quarters on the first floor.



Construction Crews Active *on* 1,250-Mile Gas Transmission System

APPROXIMATELY five thousand men are now engaged in the building of Missouri-Kansas Pipe Line Company's 1,250-mile system, from the Panhandle of Texas to eastern Indiana, connecting with the company's western Kentucky fields.

Ten crews are engaged from a point near Newton, Kan., to the eastern terminal of the line in Indiana. The mileage covered by these crews will be approximately 525. There are 3,000 men in the 10 crews.

Three crews are engaged in construction of a line from the Panhandle in Texas to a point near Liberal, Kan., and another to a point near Newton, Kan. The mileage is approximately 310.

The Oklahoma Contracting Company now has one gang of about 400 men working on its unit of the line beginning at Stinnett, Texas, in Moore County, extending to Newton, Kansas. The contracting company plans to put two additional gangs on the job in the early future.

Williams Brothers have several crews at work on their unit of the line extending east from Newton. Conner & Son has the contract for construction of a 104-mile unit from Paola, Kansas, to Booneville, Mo.

The Missouri-Kansas has closed long-term contracts with the Illinois Power & Light Company and the Missouri Power & Light Company, subsidiaries of the North American Light & Power Company, for the sale of natural gas in the cities in Missouri and Illinois where these companies maintain manufactured gas plants.

Some of the towns to be served under this plan are Booneville, Jefferson City, Moberly and Mexico, Mo., Springfield, Beardstown, Decatur, Urbana, Champaign and Danville, Ill. Executive offices of the Missouri-Kansas company are maintained in Chicago.

Mixing *and* Distributing Butane Gas

(Continued from Page 30)

per cent. Beyond these points there is no danger of an explosive mixture.

Distribution System

The distribution system was built for high pressure distribution, of welded and coated steel pipe, and distributes gas at 1½ pounds pressure. The entire system was, at completion, tested at 100 pounds pressure.

The size of the mains varies from 4- to 2-inch pipe, as follows:

610	feet of 4-inch
11902	feet of 3-inch
38428	feet of 2-inch
50940	feet—Total

All services are of ¾-inch pipe, coated and welded to the main. Dead weight type regulators and cast iron case meters were installed with the services. The regulators being set to deliver gas at 6 inches of water.

The above distribution system was laid out to serve 500 customers. Using this figure as a basis for cost, we have:

Mains (actual)	$33,205.37
500 Meters (Estd.)	6,150.00
500 Services and Regulators (Estd.)	12,650.00
Total	52,005.37
or a cost per customer of	$ 104.00

Butane-air mix gas, on account of its high gravity and slow flame progagation, cannot be burned most efficiently in the present type of appliances without some minor changes being made, such as enlarging the

NORTH MANCHESTER OPERATING RESULTS

Period—February 25th to March 24th—Actual

Gallons butane used, corr. to 60° F.	1,141.9	
Butane gas metered, corr. for temp. and press.	35,398.9	cu. ft.
Finished gas passed station meter, corr. for temp. and press.	203,910	cu. ft.
Gas registered by consumers' meters	137,000	cu. ft.
Used by company (metered)	45,700	cu. ft.
Total gas sold and used	182,700	cu. ft.
Unaccounted for gas	21,210	cu. ft.
Per cent unaccounted for	11.6%	
Gals. butane per M gas used	5.60	
Cost of butane FOB No. Manchester	$ .0888	per gal.

Cost per M gas sendout

Butane	49.70c	Heating and vaporizing 45,700 @ 67.5c	15.13
Pumping	14.40	Cost gas sendout	87.79c
Lighting	2.40	Unacc. for, 21,210 @ 87.79	9.13
Water	1.00		
Labor	5.16	Cost of gas sold	96.92c

OPERATING EXPENSES AND NET REVENUE FROM SALE OF BUTANE-AIR GAS TO 500 CONSUMERS AT NORTH MANCHESTER

Population	3500	Consumers	500
Number of houses	685	Capacity, 24 hours	120 M
Franchise			$ 25.52
Cost of butane plant, including land and R. R. Siding			$19,252.78
Distribution system			
50,940 Feet of main (actual)		$33,205.37	
500 Services and regulators (estd.)		12,650.00	
500 Meters (estd.)		6,150.00	
			$52,005.37
Total investment			$71,283.67
500 Consumers @ 23 M. per year, 11,500 M. c. f. Revenue @ $1.35 per M.			$15,525.00
500 @ $12.00 per year, service charge			6,000.00
Gross revenue			$21,525.00
11,500 M. cu. ft. @ 61c		$ 7,015.00	
10% Unaccounted for		782.81	
Distribution and office labor		2,000.00	
Estimated that profit from merchandise sales would cover office expense			
			$ 9,716.50
Net operating revenue, before provision for depreciation			$11,808.50
15% for interest, depreciation and taxes on gas generating apparatus, tanks, and heating system ($12,085.34) (6% Money—6½% Depreciation—2½% Taxes—15% Total)		$ 1,812.00	
11% for interest, depreciation and taxes on distribution system, building, R. R. siding, and miscellaneous items ($59,198.33) (6% Money—2½% Depreciation—2½% Taxes—11% Total)		$ 6,511.82	
			$8,324.62
Net income			$ 3,483.88
Cost of plant per M.c.f. of capacity		$160.44	
Total plant and distribution investment per M.c.f. capacity		594.03	
Cost of plant per consumer		38.50	
Cost of distribution system per consumer		104.00	
Entire investment per consumer		142.57	

size of the orifice in the burner spud, raising the burners so that the distance between the burner and the utensil is reduced from 1⅝ inches standard practice to 1 inch, and enlarging the ports in the burner. Tests have shown that these changes will save approximately 15 per cent in the amount of gas used over its use in our ordinary manufactured gas type of appliance.

Due to the time of the year in which the plant was put into operation (the middle of December) it was not possible to obtain the number of consumers first contemplated, as the people naturally refused to take out their coal stoves and install gas ranges at this period of the year. Consequently, the above costs are unusually high and are not to be taken as representing normal conditions. The total number of meters in use for this period was 70, and there are at present 272 services installed.

Assuming there would be 300 customers during the first year's operation, we would expect the operating costs to approximate as follows:

300 Consumers @ 23,000 cu. ft. per year	6,900	M. c. f
10% Unaccounted for	690	M. c. f.
Gas used by company for heating and vaporization	460	M. c. f.
Total production	8,070	M. c. f.
8070 M. c. f. x 5.60 gals. liq. butane per M. @ $0.0888	$4,013.00	

Power Rate:

First	200 KWH	7c
Next	300 KWH	6c
Next	3500 KWH	4c
Next	16000 KWH	3c

Operating Expenses:

(1) Butane	49.73c	per M.c.f.
(2) Pumping	7.33c	per M.c.f.
(3) Lighting	0.14c	per M.c.f.
(4) Water	0.50c	per M.c.f.
(5) Labor	0.71c	per M.c.f.
(6) Heating and Vaporizing	3.47c	per M.c.f.
Cost of Gas Produced	61.88c	per M.c.f.

KANSAS CITY GAS CO. COMPLETES HOME SERVICE COURSE

The Home Service Department of the Kansas City Gas Company, Kansas City, Mo., recently staged a party for the women completing the Spring Home Maker's course, conducted by the Department.

The course consisted of 12 lessons, covering instruction on the preparation of foods together with the correct and most economical use of gas. Diplomas were awarded the women for perfect attendance and for application to the teachings.

The company plans a similar course for the fall months under the direction of Miss Dorothy Clock, director of the Home Service Department. Classes are to be held each Tuesday and Friday for all home makers. Evening classes are being planned for those employed during the day. A series of classes, called "Cooking for Two," is also to be conducted for the benefit of brides. Special classes for the instruction of girl scouts will be held each Saturday.

UNIVERSITY OF OKLAHOMA CLASS IN PETROLEUM ENGINEERING

The University of Oklahoma, through its school of petroleum engineering, is conducting an eight week's field course in petroleum engineering, covering drilling methods, oil well completion, transportation of crude oil and natural gas, production of natural gasoline and methods of treating and refining crude oil. Dr. H. C. George is directing the activities of the class which opened June 4, and will continue through August first.

W. N. THAYER GOES WITH COAST COUNTIES G. & E.

W. N. Thayer of Southern California Gas Company, Los Angeles, recently left that company to accept a position as industrial gas engineer of Coast Counties Gas and Electric Company in the company's Pittsburgh office.

DUBACH AND BERNICE, LA., NOW GETTING NATURAL

Gas was turned on in Dubach and Bernice, Louisiana, on June 5 and 6, respectively, by the Southern Cities Distributing Company, a subsidiary of the Arkansas Natural Gas Corporation.

1930 Calendar

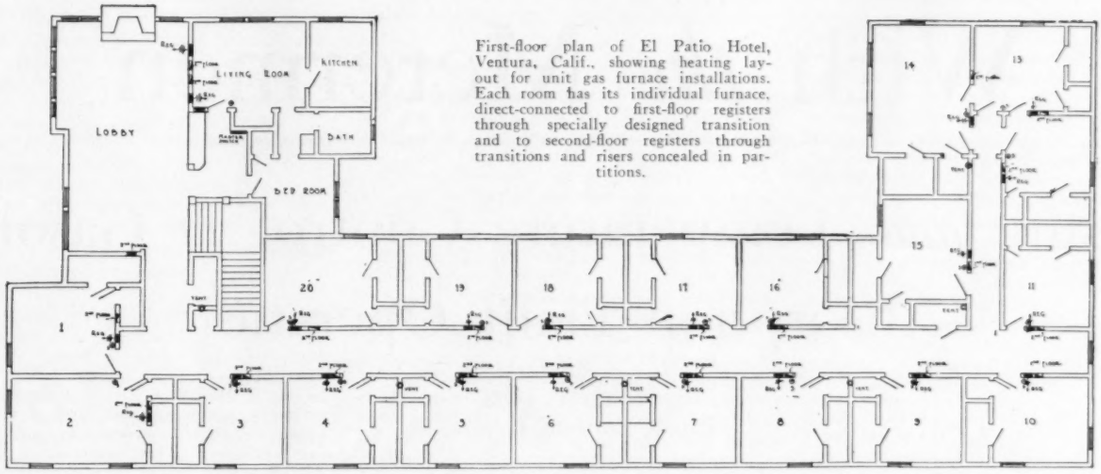
Mid-West Industrial Gas Council—Palmer House, Chicago, July 18, 1930.

Southern California Meter Association—Los Angeles, Calif., July 24, 1930.

Pacific Coast Gas Association—Huntington Hotel, Pasadena, Calif., September 9-12, 1930.

19th Annual Safety Congress—Fort Pitt and William Penn Hotels, Pittsburgh, September 29-October 4.

American Gas Association—Municipal Auditorium, Atlantic City, N. J., October 13-17, 1930.



First-floor plan of El Patio Hotel, Ventura, Calif., showing heating layout for unit gas furnace installations. Each room has its individual furnace, direct-connected to first-floor registers through specially designed transition and to second-floor registers through transitions and risers concealed in partitions.

Forty-Five Unit Furnaces Save This Hotel's Gas Bill

The method of venting is very simple. The furnaces are so grouped that as many as six and eight furnaces are connected to one common vent. This has been found to be very good practice for the reason that the flue is kept warm and a good draft is at all times established. Moreover, the installation cost is materially reduced, in comparison with using a vent for each furnace installation.

The flexible control of these 45 furnaces, however, is the outstanding virtue, it having so many salient features in economy and comfort that the sales presentation was practically built around this feature.

Connected to each furnace is a Payne electromagnetic valve, operating in the high, medium and low fire ranges, and controlled at the master plate behind the clerk's desk. This master plate is a composite of 45 single switch blocks, with red and white signal lamps, each mounted on one large brass plate, with the individual rooms designated by numbers neatly etched on plates screwed to the master plate above each set of signal lamps and push button.

In each room and located in a convenient place is a single switch, which, being wired in parallel with the corresponding switch on the master plate, also indicates by red and white lights whether the furnace is turned on and what range of fire is burning.

The El Patio is a transient hotel, and the following occurrence happens many times a day. The guest registers, a room is assigned to him, the clerk pushes a button, the heat is turned on in the room and by the time grips are unpacked, etc., the room is comfortable (at no time does it require more than 10 minutes). When shown the room he is instructed in the method of operation and is able to regulate the heat to his own individual requirements.

After cleaning up he decides to have dinner. As he passes down through the lobby the clerk looks at the master switch and finds that the guest has left his furnace burning, probably on full heat. He immediately pushes the button, turning the furnace to low, and thereby reduces the fuel consumption by two-thirds. Upon returning the guest leaves a request at the desk to be called at 5:30 in the morning. At 5:15 a. m.

(Continued from Page 27)

the clerk turns on the heat, and the guest dresses and shaves in a warm, well ventilated room. When he checks out in the morning the clerk immediately turns off the furnace, which, without a central control, might be left burning for three hours until a maid serviced the room. This brand of service has made many repeaters who have gone out of their way to enjoy this luxury so unusual in small hotels.

Mrs. Jennings, the proprietress, is very enthusiastic over this innovation in heating, because of the high type of service it renders and its low cost of operation. The El Patio is a well patronized hostelry, yet the records of the Southern Counties Gas Company show the cost of fuel, starting with December first and continuing through for six months, to be exactly $1.03 per month per furnace, which we believe is a record performance. This includes hot water heating for the entire hotel and cooking for Mrs. Jennings' apartment.

We are fully convinced that this field offers unlimited possibilities for this type of installation, especially in hotels and apartments of this type which are already built, for it is an easy matter where second and third floors are typical of the first floor to install risers and vents in the corners of closets, and install registers on the face of the closet walls.

No basement is required for this type of installation; only an access trench 2 feet wide and possibly 3 feet below joists, for lighting pilots or servicing the furnaces.

San Francisco Change *to* Natural Complete, June 19

COMPLETION of the change-over from manufactured to natural gas in the San Francisco Bay area was officially announced by the Pacific Gas and Electric Company on June 19.

Nine hundred adjusters with 66 captains and 15 supervisors worked from May 30 until June 19, changing the metropolitan district of San Francisco, comprising 101,000 meters, to natural gas service.

Harry C. Ross, manager of the Fresno Division of the Pacific Gas and Electric Company, was in general charge of the change-over program, and E. T. Floyd, superintendent of the San Francisco Division and his assistant E. G. Campbell, were in active charge of operations.

District Number 11, as this metropolitan area was called, was divided into 18 sections. To these sections were assigned from 20 to 100 men. A complete survey was made of the industrial installations and the crews worked day and night on a job until completion.

Householders were advised of the change-over by means of newspaper advertisements and a personal letter to each customer, and instructions were given concerning the use of the appliances. When the consumer was away at the scheduled time, a card was left asking that the customer notify the company as to the best time for the change to be made.

Inadequate venting was reported to the company and to the consumer.

Over 400,000 meters have been changed to natural gas on the system of the Pacific Gas and Electric Company, and the San Joaquin and Sacramento divisions will soon be added to this total.

MISS BETTY BOYLE NAMED TO POST WITH GAS SERVICE

Announcement is made by F. M. Rosenkrans, new business manager of the Gas Service Company of the appointment of Miss Betty Boyle as home economist, cooking demonstrator and food lecturer for the company.

Miss Boyle has conducted a series of cooking schools for the company, and has been permanently engaged to carry on this work over the company's system.

With *the* Metermen

Pressure *and* Temperature Control *in* Gasoline Absorption Plant Operation

By P. W. Hill
*General Petroleum Corporation**

THE natural gasoline industry as a whole in the last five years has made great strides toward increased efficiency in producing uniform specification products. With this improvement in equipment and operation has come the necessity of more exact control of two major factors—temperature and pressure.

Control equipment manufacturers have constantly improved their products to keep pace with the industry, so that the apparatus available today is markedly more sensitive, more flexible, and more dependable than it was five years ago. Yet we may be safe in stating that the last few years have but marked the beginning of the development of control equipment.

We can all remember when most of our plant control was maintained by hand operation. The results were poor and the operators were kept busy making adjustments so that more men were required.

The dependence that is placed in our present day equipment may be illustrated by a conversation I overheard recently between a plant foreman and a construction superintendent relative to certain plant piping changes. The construction man suggested that it might be necessary to shut off the air supply for the air-operated controllers in the entire plant for a short period. The plant foreman strenuously objected, saying "Don't do that! It would take us a week to get straightened out if we ever went on to hand control."

P. W. Hill

This paper will, of necessity, be limited to generalities dealing with pressure and temperature control as applied in a gasoline plant, with the object that more importance may be attached to the control side of operation and design.

PRESSURE CONTROL

Pressure controllers are divided into two groups—back pressure and reducing—of which the functions are obvious. They may still further be classified as being "direct-operated" or "pilot-operated."

The "direct-operated" regulators make use of a diaphragm which flexes with changing pressure against a variable resistance provided by a spring or weight and lever. This motion is directly transmitted to a valve which opens or closes with changing pressure on the diaphragm.

In general the "direct-operated" type is less expensive and is to be preferred for use under lower pressures when some variation in the controlled pressure is not objectionable.

The "pilot-operated" regulator involves the use of an external supply of gas or air under constant pressure. The pilot regulator controls the pressure on a larger diaphragm valve. The system is arranged so that a slight change in pressure on the pilot causes a much greater valve travel than would be possible in the "direct-operated" type.

The use of this type is indicated in conditions of high pressure, i.e. 150 pounds or over, also when wide variations in flow are expected under a constant pressure. This regulator is more sensitive than the "direct-operated" and should be used where the most exact control obtainable is desired.

This group also includes the recorder-controllers which are essentially recorders to

*Presented before the Southern California Meter Association, May 22, 1930.

S.C.M.A. Holds Fourth Year Elections

B. G. WILLIAMS, measurement engineer for the Southern California Gas Company, supported by an able selection of officers and committee heads, will guide the Southern California Meter Association as president during the coming year.

Election night brought well over 100 members and visitors to the June 26 meeting of the S.C.M.A., held at the Breakers Hotel, Long Beach, Calif.

B. G. Williams

Following dinner, and prior to the elections, a short business program was conducted, featured by a paper from the Standards Committe, read by T. K. M. Smith, chairman. "A New Still for Reclaiming Mercury for Use in Orifice Meters," was the paper's title. One of the mercury stills, which have been developed by H. E. Thompson of the Los Angeles Gas and Electric Corporation, was displayed to illustrate the paper.

President R. F. Angell, winding up the final business meeting in an outstandingly successful year, opened the election of new officers by calling for a report of the nominating committee. Membership of this committee was made up of M. J. Cereghino, chairman, H. A. Hurley, J. R. McLaughlin, J. A. Swindle, C. W. Brockman. As submitted by Mr. Cereghino, the report recommended the election of the following men to head S.C.M.A. affairs for the ensuing year:

President: B. G. Williams, Southern California Gas Co.

Vice-president: V. E. Schultz, Signal Hill Gasoline Co.

Treasurer: C. M. Krieger, Standard Gasoline Co.

Secretary: W. J. Kennedy, Los Angeles Gas and Electric Corp.

Chairman Program Committee: P. W. Hill, General Petroleum Corp.

Chairman Entertainment Committee: T. G. McAlister, Texas Corp.

Chairman Membership Committee: F. E. Bradley, Chanslor-Canfield Midway Oil Co.

Chairman Standards Committee: W. L. Cowan, Union Oil Co.

Chairman Publications Committee: Edgar Wilde, Southern Counties Gas Co.

Chairman By-Laws Committee: W. Shellshear, Gilmore Gasoline Co.

After throwing the meeting open for additional nominations, ballots were passed out and the above panel of officers was adopted.

Following business for the evening, Malcom Miller opened up another surprise package as chairman of the entertainment committee. An indoor horse race, a high class dance team, a comedy relief musical pair, and some miscellaneous numbers were among the attractions which brought Mr. Miller's very able committee work to an end for the year.

With the official election of officers now in the past, the Southern California Meter Association enters its fourth year. Membership grew last year to a total of 242, and the launching of the extension course in gas measurement and other progressive steps made last year a big contribution to the Association's advancement.

KREBS, OKLA., NOW RECEIVING NATURAL GAS SERVICE

The Public Service Company of Oklahoma has recently completed a gas distribution system in Krebs, Okla., and a 6-inch natural gas line from McAlester to Krebs, through which the town will be served.

which controlling mechanism has been applied. These controllers operate motor valves placed in the line.

The selection of the proper controller is important for good operation. The factors influencing the decision may be listed as follows:

Possible operating range.
Pressure drop.
Down-stream pressure.
Maximum volume requirements.
Degree of sensitivity required.
Characteristics of fluid handled.

With these factors in mind it is possible to select the proper equipment for any given condition.

Care should also be exercised in the proper installation of pressure control apparatus. It should be borne in mind when installing a regulator that the pressure connection should be located at the point of control. This is particularly important in the case of pressure vessels such as accumulators, absorbers, and the like. Too often we attempt to control the pressure in an accumulator with the diaphragm connection taken at a point on the line just up-stream from the regulator. In this case, increased velocities cause a drop in pressure at the regulator, giving irregular pressure control at the accumulator.

In cases of high pressure drop across the regulator it is well to make sure that the outlet line is of sufficient size to pass the maximum flow without serious drop in pressure. When reducing gas from high to low pressures, it should be remembered that expansion is accompanied by cooling which may cause moisture present to freeze and stop the flow. The remedy for this condition is to reduce the pressure in stages allowing sufficient line between regulators to permit the gas to absorb heat from the surroundings or from some artificial source.

It is perhaps obvious to mention that each regulator should be equipped with a by-pass to facilitate repairs without a shutdown.

Since the operation of a natural gasoline plant is somewhat variable, depending on the circumstances and the ideas of the operator, the application of pressure control must meet the requirements of the particular plant. However, the writer will enumerate the conventional points of control, together with a few notes regarding the applications.

1. Field—Well Traps

It is customary to maintain sufficient pressure at the trap to permit the flow of oil to storage. The usual regulator is of the direct-operated type capable of passing the gas flow with a minimum pressure drop. It is good practice to place this regulator at the down-stream end of the meter run, in order to provide better metering conditions.

2. Absorber Pressure

Following the line of gas flow, the next important control point is at the discharge of the absorbers. The controller should be located down-stream from the master dry gas meter and should be large enough to pass the entire plant volume with a few pounds pressure drop. The regulator should be of the pilot-operated type with the pilot diaphragm connection taken up-stream of the meter as near the absorbers as practical. An installation such as this represents considerable expense, particularly in flush production fields, but provision should be made when designing a plant for the probable installation, as a controller in this location provides an important safeguard from plant pressure fluctuations due to changing demands in the field, variations in sales, and in the amount of gas blown to air, not to mention possible increased extraction efficiency due to a more constant absorber pressure.

3. Dry Gas Disposal System

In many plants the order of precedence in dry gas demands runs as follows: 1st, plant fuel; 2nd, field fuel and dry gas returns; 3rd, sales (if any); 4th, dry gas to air.

Proper pressure control provides us with an easy method of maintaining this order of precedence. The dry gas from the absorbers after passing the master meter and master regulator should flow into a manifold from which the gas is distributed. It is convenient to have the meters located at this point with regulators at the ends of the meter runs, thus making it possible to have one common by-pass made up of a meter run and regulator. This form of installation permits the changing of orifice plates and regulator repairs without a shutdown and has the added advantage of providing an auxiliary outlet in case any one of the normal outlets becomes temporarily overloaded.

All of these outlet regulators should be connected to the up-stream manifold. In most instances these regulators should be of the pilot-operated type to take care of variable demand.

4. Rich Oil Vent Tank

This regulator controlling the pressure of this piece of equipment may be direct-operated since some fluctuation is not serious. The pressure connection should be taken from the accumulator itself.

5. Run Down Accumulator

Since regulator at this point controls the still pressure, it should be sensitive to a half-pound to be consistent with good operation. However, the flow is usually fairly uniform and a direct-operated regulator with the pressure connection taken from the accumulator is generally successful.

6. Storage Tanks

Use is made of the vapor evaporated from the gasoline to provide a constant pressure on gasoline storage tanks.

7. Stabilizer or Rectifier

The importance of accurate pressure control of a rectifying column can hardly be stressed too much. Without it, temperature control and the resulting uniformity of product are impossible. It is necessary that the selection and installation of equipment for this purpose be made with great care. The pressure connection should be taken at the point where the pressure is to be controlled—usually the rectifier tops accumulator. In this regard, it is important that the operation be such as to furnish a continuous supply of uncondensed vapor without which the back pressure cannot be maintained.

Unquestionably there are many other points in a gasoline plant where pressure control is either necessary or advantageous, but since these are more or less individual problems to be worked out in each plant, it will be assumed that the applications will follow the general principles outlined in the fore part of this article.

TEMPERATURE CONTROL

Automatic control of temperature at various points in a natural gasoline plant has become increasingly important with the more stringent specifications of the product. This refers particularly to the control of the distillation end-point and recovery of the finished natural gasoline.

The control of temperature is generally effected by regulating the amount of cooling or heating medium added to the process.

Temperature control equipment makes use of several physical changes caused by a change in temperature. In the most simple form control is effected by expansion. Use has been made of the expansion of solids, liquids and gases. In a second form the change in vapor pressure of a liquid provides the motive power. Under the electrical controllers, comes the thermocouple and the resistance thermometer which makes use of the fact that the resistance of conductors varies with temperature.

Probably the most frequently used type of controller in natural gasoline plants, however, is a combination recorder and controller, of the so-called vapor tension type. A bulb containing a volatile liquid is placed in the line or vessel under control. A capillary tube from the bulb leads into the instrument to a coiled tube. This entire system is sealed pressure tight. When the temperature of the liquid in the bulb is elevated, its vapor tension increases, tending to uncoil the coiled tube at the other end of the capillary. This motion is transmitted by linkages to a pen arm which records directly the temperature at the bulb on a chart, giving the recording function of the instrument. The control function is accomplished by connecting a small air valve to the same linkage that moves the pen arm. Thus a change in temperature at the bulb effects a change in opening at this small air valve. If air under a constant pressure is admitted to one side of this valve, the pressure on the down-stream side will therefore vary with the temperature at the bulb. Finally, if a diaphragm valve, installed in the line conveying the heating or cooling medium, is connected to this small air valve we now have a system capable of controlling temperature.

There are two methods in which control equipment may be operated. The first is the intermittent or "on-off" control. In this case when the temperature reaches a predetermined point the controlled valve in the steam line, let us say, closed completely and remains in that position until the temperature falls below the control point. Since there is always a lag between the time that the steam is applied and the effect reaches the bulb, there is a tendency for the temperature to rise above the control point after the steam valve has closed. Conversely, the temperature will fall below the control point after the steam valve has opened. The effect known as "over-control," in most instances is detrimental to efficient operation since it causes "surging" throughout the apparatus under control. This effect can be minimized by installing a by-pass around the controlled valve through which a constant quantity, usually the major portion, of the heating medium passes. In many instances this mode of control is satisfactory, but it is often open to the objection that it is not flexible enough to take care of normal fluctuations in the quantity of steam required.

The second method is the continuous or "floating" type of control. In this instance, the instrument is so designed as to have a throttling range on each side of the control point. That is, as the temperature rises the controlled valve starts to close before the control point has been reached and continues to close beyond this point, so that under normal fluctuations the valve is never completely closed nor yet reaches full opening, but has the tendency to hold the opening required to maintain the temperature at some point within the control range. Due to the conditional time lag mentioned above it is necessary in most instances to slow down the controlled valve action until its effect is as slow as the temperature reaction. This means that the rate of travel must be

slow enough to allow the recorder to register the effect of a small increment of valve travel. This "slowing-down" may be accomplished by introducing a restriction in the air line to the motor valve, or by the addition of capacity in the line, or by a combination of both. This method of control more nearly simulates close hand-control and will eliminate "surging," but has the disadvantage of not responding quickly to a sudden change in temperature. There is also a tendency to control at a variety of points within the throttling range, which may be objectionable in some processes.

When installing a temperature controller a careful analysis of conditions should be made to help in selecting the proper type of equipment and mode of operation. Care should be taken to install the sensitive portion of the instrument at the logical point for temperature control. It is also quite important to select the proper size and type of motor valve.

Referring to the air controlled type of equipment described before, four combinations of instruments and controlled valves are possible. Controlled valves are generally referred to as direct acting when they open with increased pressure on the diaphragm; conversely, as reverse-acting when they close with pressure. Similarly instruments are known as direct-acting if the controlled air pressure increases with temperature and reverse-acting when the pressure decreases with increased pressure. The application of these four combinations are outlined:

Valve to close if air supply fails:

1. Heating operation: Direct instrument, direct valve.
2. Cooling operation: Reverse instrument, direct valve.

Valve to open if air supply fails:

1. Heating operation: Reverse instrument-reverse valve.
2. Cooling operation: Direct instrument reverse valve.

In any process such as the production of natural gasoline, involving heating, distillation, and fractionation, proper temperature control plays an important part. Future development will undoubtedly require new applications for control where automatic regulation is not considered necessary at the present time. In this paper we will consider only the conventional points for control.

Distillation Unit Dephlegmator

The function of this piece of equipment is to control the distillation end-point of the natural gasoline produced. The end-point varies with the temperature at the outlet of the dephlegmator, so that it is important that this temperature be maintained in order to produce gasoline of uniform end-point characteristics. This is accomplished by one of two methods, either by the use of cooling water circulated through a condensing section at the top of the dephlegmator or by introducing part of the gasoline produced as a reflux at the top of the column.

In either case, the control is effected by introducing a sensitive element at the point of control and adjusting the instrument to regulate the flow of cooling medium.

Rectifier Reboiler

The recovery and vapor pressure characteristics of the finished gasoline from a rectifier depend largely on the temperature maintained at the bottom of the column. Control apparatus in this service must be sensitive, since a variation of even one degree at this point may cause a noticeable change in the distillation recovery. This is particularly true in installations where a sharp fractionation is being effected.

In most cases reboiler control is accomplished by controlling the volume of steam admitted to the reboiler steam space, with the sensitive element located at the gasoline outlet of the reboiler.

With this application there is usually a noticeable process lag which makes automatic control more difficult. This lag is probably caused by the fact that change in temperature of gasoline at its boiling point is accomplished only after a certain portion has evaporated. Thus most of the heat added to the system is absorbed as latent heat by the vaporizing gasoline and only a small part is used in raising the temperature of the boiling liquid. The result of this condition is a tendency to over-control, making it necessary to slow down the valve action.

There are other points in the operation of natural gasoline plants at which temperature control may be applied profitably, resulting in profitable heating economies. The study of each individual problem in temperature control is interesting and usually results in increased efficiency.

UNIVERSITY OF TEXAS MAY BUILD LINE TO AUSTIN

Recent news dispatches state that the president of the University of Texas, and the members of the lease board of the school are considering the construction of a natural gas line from university lands in the Big Lake Field of Reagan County, Texas, to the University at Austin.

The line would be about 300 miles in length and could be constructed at an approximate cost of $3,000,000. About 90,000,000 cubic feet of gas daily is being produced on the University lands, and is going to waste, according to the lease board, which points out that the annual fuel bill at the state institution at Austin is around $100,000.

GUTHRIE TO HAVE MUNICIPAL GAS DISTRIBUTION SYSTEM

Guthrie, Oklahoma, at an election on June 16, authorized the issuance of bonds to the amount of $225,000, to be used for construction of a gas distribution system in the city. Guthrie Gas Service Comany, a Lone Star subsidiary, at present serves the city with gas, purchased from the Oklahoma Natural Gas Company. The Guthrie city council proposes to buy gas from the Cherokee Public Service Company, who plans the construction of a gas line from the Oklahoma City field which will serve Guthrie.

UTILITIES DISTRICT CONTINUES NATURAL GAS NEGOTIATIONS

Utilities district directors of the city of Omaha rejected, early in June, all proposals to pipe natural gas to Omaha, but shortly thereafter decided to continue negotiations with the bidders, when it was learned that at least one of the companies wanted to submit a new proposal.

The original decision to reject the bids came when the district directors decided that the city could manufacture gas cheaper than it could purchase natural gas under the bids submitted.

Bids of the Western Natural Gas Company, the Missouri-Kansas Pipe Line Company and the Missouri Valley Pipe Line Company were those rejected the first of June. Representatives of the Western Natural Gas Company asked that negotiations be continued in order that the company might prepare a new proposal.

Cities Service Company refused to bid originally under the Omaha specifications, but submitted a letter suggesting that gas would be available to Omaha from the line which is being constructed from the Panhandle to Chicago.

BANNATYNE PIPELINE CO. FILES ARTICLES OF INCORPORATION

The Bannatyne Pipeline Company has filed articles of incorporation at Great Falls, Montana. The purpose of the company, as stated in the articles of incorporation, is to distribute gas and to operate pipe lines. The incorporators and directors of the company are Walter F. Brittan of Great Falls and Elmer L. Williams and W. J. Allison, both of Minneapolis, Minnesota.

SKELLY OIL CO. GETS PERMIT TO SERVE BUTANE GAS

Skelly Oil Company was recently granted a gas franchise at Manchester, Iowa, for the service of butane gas.

Work has already been commenced on the plant which will be constructed at a cost of about $100,000. The plant is expected to be completed in the early fall.

1930 PETROLEUM EXPOSITION ADDS TO FACILITIES

Plans for the 1930 International Petroleum Exposition and Congress to be held at Tulsa, October 4-11, are advancing, with additional facilities for housing the exhibition being brought to completion, according to William B. Way, general manager of the Exposition.

The new Refiners and Marketers Building is almost complete, and the new California Building will add to the growing facilities. Twenty-five per cent more space is available this year than in previous years, and the number of exhibitors has increased 70 per cent over what it was at this time last year. Contracts have been signed for 92 per cent of the available space.

CANADIAN WESTERN COMPLETES SYSTEM AT FOREMOST

Canadian Western Natural Gas, Light, Heat and Power Company, with headquarters at Calgary, Alberta, has completed construction of the distribution system at Foremost. The new system is connected to the company's main line from the Turner Valley fields.

MID-WEST NATURAL GAS CO. GETS NEBRASKA FRANCHISE

Gas franchises were recently granted the Mid-West Natural Gas Company in the towns of Wakefield and Uehling, Nebraska, according to press report. Panhandle gas is to be supplied the towns, the report stated.

ELLIS COUNTY GAS COMPANY IS INCORPORATED AT ABILENE

The state charter board of Kansas recently granted a charter to the Ellis County Gas Company of Abilene, organized with a capital of $100,000.

The Value *of* Acceleration Due *to* Gravity *in* Computing Orifice Coefficients

By W. R. Beardsley *and* Leonard F. Carter

Meter Department, Colorado Interstate Gas Company

HERETOFORE, the practice of most natural gas companies has been to accept as correct, standard coefficients as published by various orifice meter manufacturers, correcting these coefficients to various gravities, atmospheric pressures and pressure bases; but very little attention is being given to the constant in the orifice coefficient formula. This constant, generally expressed as K, is dependent upon the value of the acceleration due to gravity, weight of water per cubic foot and units of measurement. It would be well to investigate just how large an inaccuracy would occur in the measurement of large volumes of gas using the wrong value of K. Some might say that there is so little difference between the value of K as given in different handbooks, and its actual value at the location of the point of measurement, that it is negligible, but it is surprising to know that an error in value of K may amount to many thousands of dollars in a year's time where consumption or deliveries amount to 50,000,000 cubic feet or more daily average.

It is essential that calculations applied to coefficients should be with absolute accuracy, and to this end it has been the authors' purpose to graph the constant as it appears in relation to altitude and latitude.

The value of the acceleration due to gravity, known as (g), is the primary element in figuring gas constants. The value of (g) decreases as the elevation above sea level, or the distance from the center of the earth increases, as shown by the decrease in the value of (g), given in Fig. 1, taken from Smithsonian Physical Tables 1921, Page 424.

From this graph the value of (g) relative to the location of point of measurement, as given by the Smithsonian Physical Tables, can readily be determined. Based on $g = 32.08783 \quad (1 + 0.005294 \ \mathrm{Sin}^2 \ \mathrm{Lat.} - 0.000007 \ \mathrm{Sin}^2 \ \mathrm{Lat.}) - 0.000003086E$. Where (g) = Acceleration due to gravity; Lat. = Latitude; and E = elevation in feet above sea level.

The difference in the value of (g) for different latitudes and elevations is not great, but it is large enough that we wish to call attention to the importance of its use in the orifice meter formula. The general formula for finding the quantity of gas flowing through an orifice in one hour is:

$$Q = \frac{3600 \times .7854 d^2}{144} \times \frac{C_v \, P \, T_b}{T_f \, P_b} \times \sqrt{2g \frac{h}{12} \times \frac{Z \, W_w \, T_f}{P \, G}} \qquad \text{I}$$

in which

Q = quantity of gas in cubic feet at assumed standard conditions flowing through an orifice in one hour (3600 seconds).

d = diameter of orifice in inches.

C_v = coefficient of velocity depending upon size of orifice to size of line.

P = absolute pressure of flowing gas in pounds per square inch.

P_b = assumed pressure base of standard cubic foot in pounds per square inch absolute.

T_f = absolute temperature of flowing gas in degrees Fahrenheit.

T_b = assumed base temperature of standard cubic foot in degrees absolute.

g = acceleration due to gravity in feet per second per second.

h = differential across meter in inches of water.

Z = constant for air expressing relation between pressure, temperature and weight per cubic foot = 0.37009.

W_w = weight of water in pounds per cubic foot.

G = specific gravity of the flowing gas as compared to air.

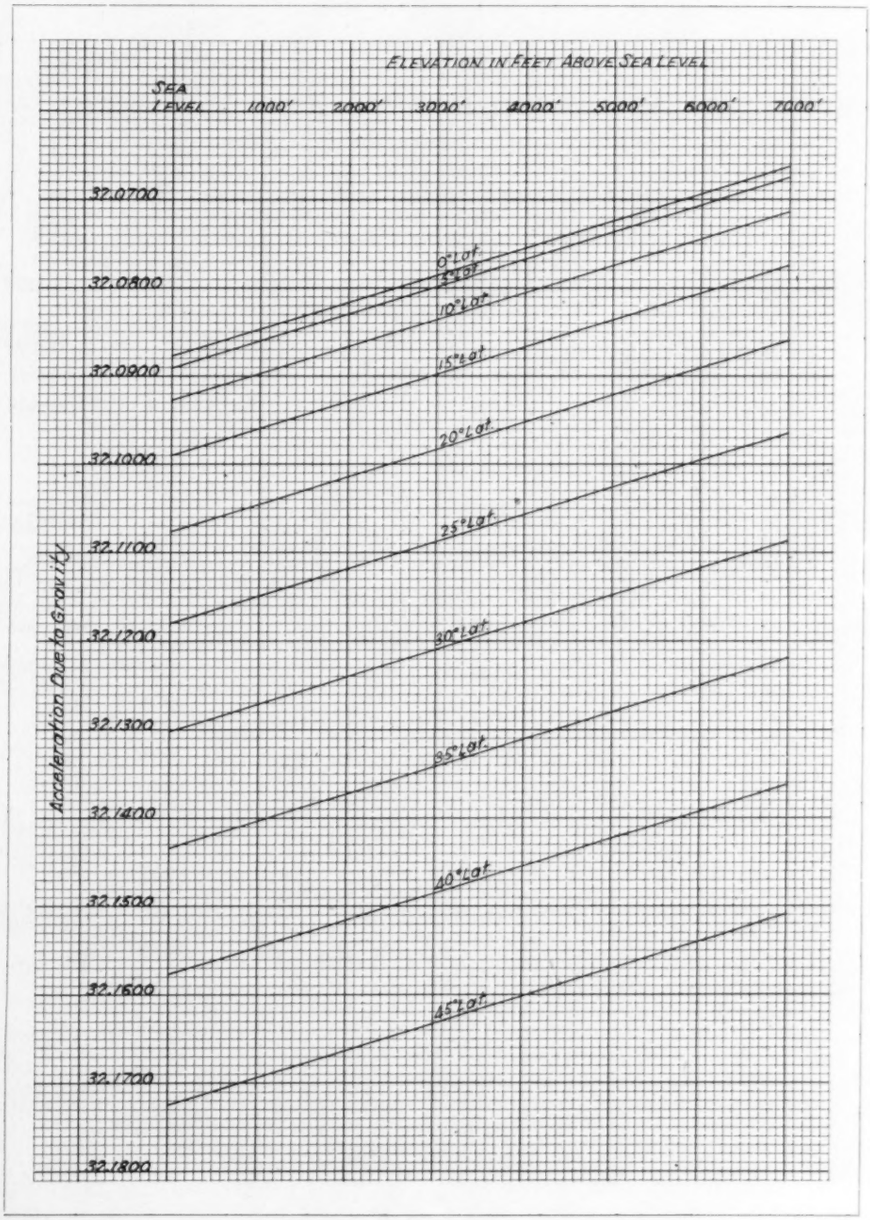


Fig. 1

Simplifying this formula and letting:

$$K = \frac{3600 \times .7854}{144} \sqrt{\frac{2\,g\,Z\,W_w}{12}} \qquad II$$

the general formula becomes:

$$Q = \frac{K\,d^2\,C_v\,T_b\sqrt{h\,P}}{P_b\sqrt{T_f\,G}} \qquad III$$

and letting C be termed as the coefficient

$$\text{and} = \frac{K\,d^2\,C_v\,T_b}{P_b\sqrt{T_f\,G}} \qquad IV$$

the formula then becomes

$$Q = C\sqrt{h\,P} \qquad V$$

In formula II, the value of Z is 0.37009 and the value of $W_w = 62.367$ at 60° F. Applying these known values and simplifying, formula II becomes:

$$K = 27.2314\sqrt{2g} \qquad VI$$

Formula VI was the one used in plotting the value of K in the graph shown in Fig. 2, the value of (g) being determined from the formula given in the Smithsonian Physical Tables, stated previously in this article.

The significance of this graph lies in the fact that the value of K for any given latitude and elevation can be read from the graph, thus saving time and labor in its computation. The graph should be of value to those companies which measure their gas in mountainous regions or where the elevation of the points of measurement above sea level are not all the same. Also, it should be of value where the latitudes of the points of measurement are different. In case the exact value of (g) has been measured and is known for a certain locality, it would be desirable to use that value in formula VI in determining the value of K.

The principal thought prompting this article is to call attention to the constant error produced in using the wrong value of K in the orifice coefficient formula.

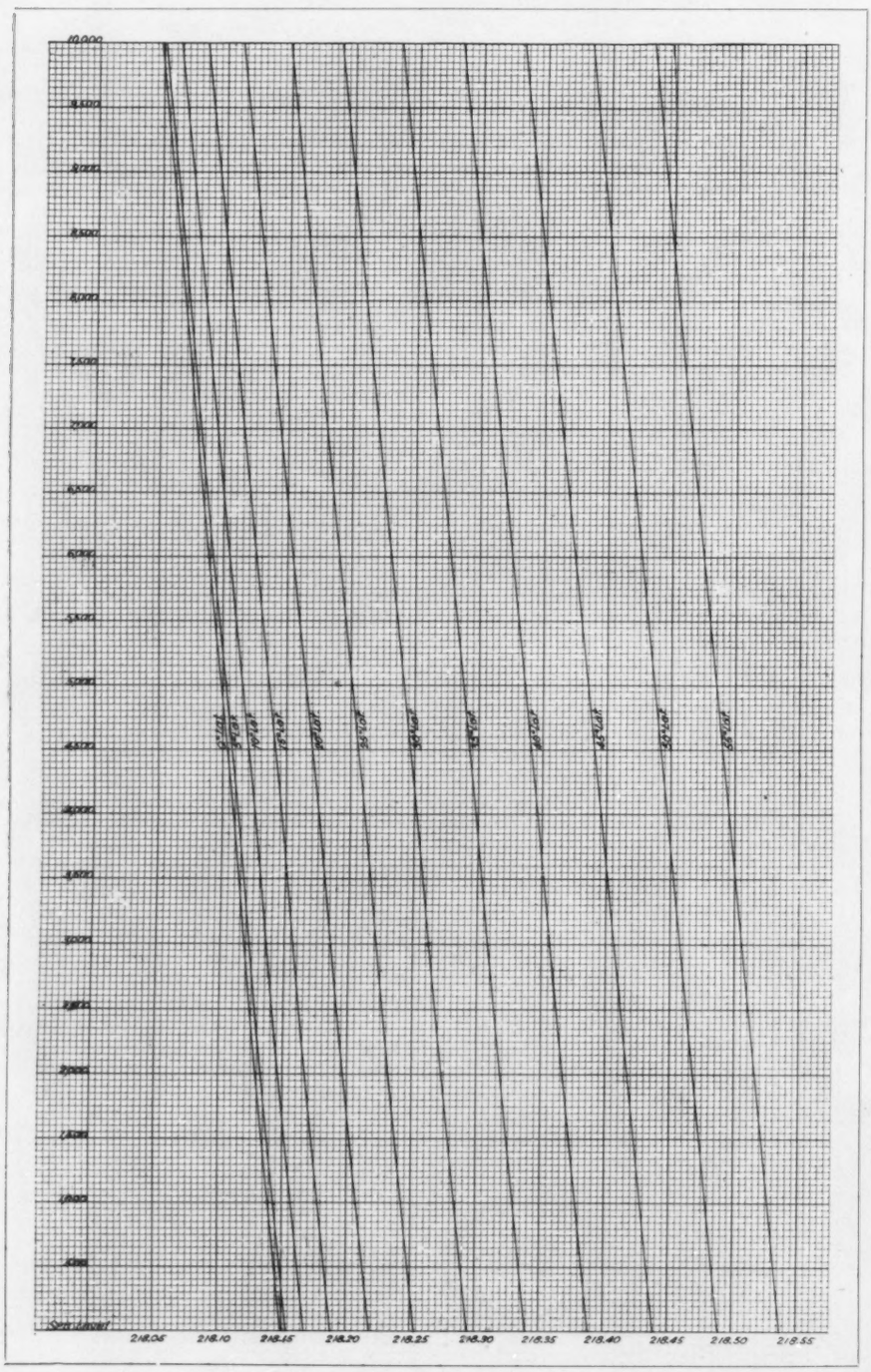


Fig. 2

30 GOLFERS OUT FOR JUNE TOURNAMENT OF S. C. M. A.

The S.C.M.A. golf tournament of June 22 was one of the best attended to date—perhaps because of the free golf balls arranged for by Chairman M. R. Miller. T. K. M. Smith of the Industrial Fuel Supply Company won low net, and the right to have his name on the S.C.M.A.—*Western Gas* Good Fellowship trophy. Low gross and a merchandise prize went to C. J. Warren of the General Petroleum Corporation and second low net to H. G. Andrews of the Southern California Gas Company, who also received a merchandise prize. Merchandise prizes were given through the courtesy of the Reliance Manufacturing Company of Alhambra, Calif.

SOUTHERN UNION GAS CO. IS SERVING NICHOLS HILLS, OKLA.

Southern Union Gas Company of Dallas has brought to completion a 12-mile gas line serving Nichols Hills, a new town on the northern outskirts of Oklahoma City. The line originates in the Oklahoma City gas field. The Pioneer Gas Utilities Company, a subsidiary of the Southern Union, will operate the distribution system which has been completed. Gas service in the town was scheduled to begin in June.

CUT BANK, MONT., SOON TO HAVE NATURAL GAS SERVICE

Gas service is expected in the town of Cut Bank, Montana, by the middle of July. The Drumheller interests have a natural gas franchise in that town.

NEW SPRINGFIELD LINE BRINGS GAS SERVICE SYSTEM CHANGES

A NUMBER of changes and transfers in some of the Gas Service companies has been announced by Charles H. Koinm, chief engineer, and Harry Warner, secretary-treasurer.

Harry Sibenthaler, who for the past year has been manager of Carthage Gas Company, is now manager of the Ozark Distributing Company, properties of which include distribution systems in the towns piped for gas along the new Springfield line. These towns are: Neosho, Pierce City, Marionville, Monett, Aurora, Republic and Billings.

A. H. Maeder has been transferred to the Ozark Distributing Company from Sedgwick, Kan., where he has been district superintendent for the northern group of towns operated by Western Distributing Company.

Mr. Maeder is named superintendent of the Ozark Distributing Company and will make his headquarters at Aurora. His duties will be confined chiefly to Aurora and the two towns east of that city, Republic and Billings, with Mr. Siebenthaler personally supervising Monett and the towns west of Monett.

Mr. Siebenthaler's position as manager of the Carthage Gas Company has been filled by Ralph D. Ford, formerly chief clerk of Union Public Service Company at Ottawa, Kan.

W. R. Phillips, chief clerk of the Newton Gas Company has been transferred to Ottawa, as chief clerk. Mr. Phillips' position in Newton is to be filled by Earl Jones of Western Distributing Company at Augusta. Ava F. Baldwin has been transferred from the El Dorado property to Augusta as chief clerk.

An official opening of the Ozark Distributing Company's new office at Aurora, Missouri, was celebrated June 14. Throughout the opening day, every woman who visited the office received a gas toaster free and chances on a Roper Range and an Estate Triple Effect Heater, which were given away at a drawing held a week later.

Other towns served by the Ozark Distributing Company, affiliated with the Gas Service Company, are Neosho, Pierce City, Marionville, Monett, Forest Park, Billings and Republic. Gas has been turned on in all of the towns within the last year, and at Aurora, Billings, and Republic, just recently.

The company reports the following services to have been installed over the system: 358 new services have been received and installed and 352 meters set at Neosho; at Pierce City 72 new services have been received and installed and 59 meters set.

Monett has set 222 meters and received and installed 262 new services. Aurora has received 34 new services, of which 22 have been installed. Fourteen meters have been set. Marionville has received and installed 55 new services and set 40 meters. At Billings 12 services have been received and installed and nine meters set. No figures are shown for Republic due to the fact that gas was not turned on in the city until June 9.

NEW DIRECTORS NAMED TO BOARD OF UNITED CORPORATION

Five new directors were added to the board of the United Corporation, recently, bringing the total number of directors to 10.

The new directors added are Floyd L. Carlisle, Anchor Cap Corp; B. C. Cobb, Commonwealth & Southern Corp.; Philip G. Gossler, Columbia Gas & Electric Corp.; Thomas N. McCarter, Public Service Corp., of New Jersey; and John E. Zimmermann of the United Gas Improvement Corp.

The former board of five directors include George H. Howard, president of the corporation, Thomas S. Gates, Alfred L. Loomis, Landon K. Thorne and George Whitney. The last named and Thomas S. Gates are partners in the firm of J. P. Morgan.

NEW BUILDING FOR GAS SERVICE AT KANSAS CITY, REPORT

B. C. Adams, vice-president and general manager of the Gas Service Company has announced the construction of a 35-story office building to be located either at 10th and Main or at 10th and Baltimore, Kansas City, according to news dispatches.

Plans for the building have already been made and accepted, according to the report. Gas Service Company is a Henry L. Doherty interest.

Modernizing Gas Service *in* Salem

(Continued from Page 32)

ports and was of a tarry nature. It was difficult to obtain any great quantity of this material from a plugged needle valve or gas range cock.

Tar camera pictures showed a black or grey dust collecting on the filter paper. During this time the trouble apparently was becoming more pronounced. Certain cocks on much used ranges would plug up in 48 hours. Finally enough material was collected so that it could be determined that the stoppage was due to a dust collecting on the lubrication of the gas cocks and needle valves. By dissolving out the grease the deposit was found to be a dark greyish brown dust. Only very slight traces of iron and no cyanides were found to be present.

Kerosene was vaporized into the distribution system in an effort to wet down any dust that might be present in the distribution system, and thus prevent it being picked up by the gas. This practice had no effect on the number of stoppages being reported. It was finally determined that the material causing the stoppage was a carbon dust coming from the coking chambers.

It is to be noted that the dust passed through two bends of oxide 2 feet thick, and one shaving scrubber, and did not settle out in a holder whose capacity was about equal to one day's consumption of gas.

This same trouble had occurred at previous times before and had disappeared again as mysteriously as it came. When gas was turned into the Salem system from Portland the dust trouble disappeared at once, which was considered convincing proof that the trouble came from the plant operations. And the carbonaceous nature of the dust indicated its origin in the retort chambers.

FINDING THE MARKET

The purchase of the Salem Plant was completed on August first and Portland gas was available in Salem on November third. Original estimates had contemplated securing 50 per cent of the 3,960 houses off the mains in Salem, or 1,982 new customers. Owing to the lateness of the year and the fact that the majority of the people already had their winter's supply of fuel it was realized that this number of customers could not reasonably be expected before the following year. Canvass of the first district in Salem was started five weeks in advance of arrival of the gas from Portland, and the installation of lateral mains and services was completed in this district by the time the gas arrived from Portland. As our canvass of the first districts progressed it was found that a great many people had never used gas and were unfamiliar with its operation or cost. Competition with other fuels was not as keen as anticipated, but people were skeptical and the majority preferred to await the experience of their neighbors. On the other hand, we also found a sprinkling of people scattered throughout the city who had used gas elsewhere, applying for immediate service. In order to take care of these people, who would also serve as examples from which their neighbors could judge, and at the same time confine our construction activities to a district at a time, schedules were advanced so that gas would be available throughout the city by February 15, or three months after the Portland gas reached Salem. A flying canvass of the 3460 remaining houses was made by five salesmen, each salesman being required to make 25 calls per day. On this first solicitation we secured 441 new customers in the eight districts, or 11.1 per cent of the houses canvassed. During the construction period and up to April 20, additional applications to the number of 127 were secured; 98 of them required further extension of our mains. During the week of April 20 to April 27 a campaign to secure additional customers was inaugurated, temporarily using salesmen from Portland. During this one week 301 additional meter and service applications were secured, requiring 50 additional extensions to our mains. Additional applications are being received at the rate of four or five a day. The industrial business during the first seven months increased from 63 customers with a monthly sales of 575 M. cubic feet to 132 customers with a monthly sales of 1,068 M. cubic feet.

Before inaugurating our solicitation in Salem, representative dealers were advised to stock ranges, water heaters, and other gas appliances. Many sales of appliances were made through these dealers. During the short period of seven months up to April 20, during which time efforts of our five solicitors were confined principally to securing new customers, we sold $55,920.78 worth of appliances, of which the leading items were: 397 ranges, 230 water heaters, 52 hot plates.

Up to May 1 we had laid 29 miles of laterals in Salem and secured 869 new customers, or 44 per cent contemplated in the original estimate. In view of the prospects which we have on hand and with the coming of warm weather we are confident that the required 1,982 customers will be secured by September 1.

Simultaneously with the solicitation and construction work in Salem, solicitation and construction was started along the route of the main line in the towns enroute. This included the incorporated cities of Tualatin, Aurora, Woodburn, Hubbard, Brooks, and Gervais. Our experience in these towns was comparable to our experience in Salem.

We are now starting construction on the second phase of our Willamette Valley program. This includes laying 28 miles of 6 inch and 41 miles of 4 inch main, 80 miles of laterals, and serving the incorporated towns of West Salem, Independence, Monmouth, Albany, Lebanon, Corvallis, Mt. Angel, and Silverton during 1930. Next year's program contemplates a 28-mile extension to serve the incorporated cities of Sherwood and Newberg.

SPIRO GRANTS FRANCHISE TO THE LE FLORE COUNTY G. & E.

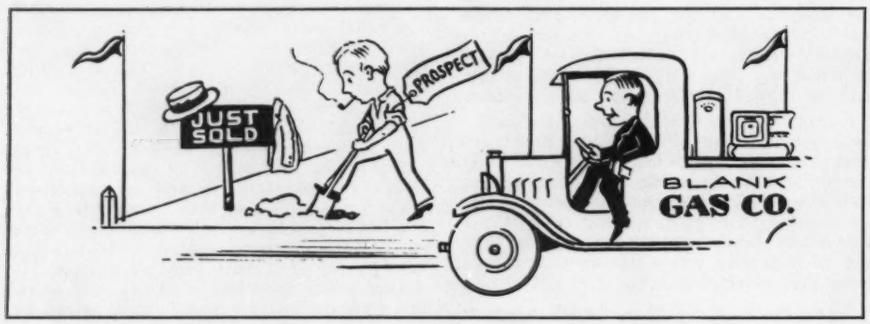
Following the granting of a 25 year gas franchise by Spiro, Oklahoma, to the LeFlore County Gas & Electric Company, the company has announced plans for the construction of a gas line from the Red Oak, Okla; to Ft. Smith Ark., and to Spiro, Okla. The line is to be completed before November 1, the date specified in the franchise for the serving of gas.

GENERAL UTILITIES CO. ASKS THREE KANSAS FRANCHISES

The General Utilities Company of Kansas City is seeking franchises at Smithville, Platte City, Plattsburg and Cameron, Missouri. Gas is to be supplied, according to report, from fields local to the towns. The General Utilities now operates at Liberty, Missouri.

SALES WRINKLES

"He Gains Wisdom in a Happy Way Who Gains it by Another's Experience"... PLAUTUS



Beat the Architect to New Builders

"EVERY salesman who goes after the new home builder market knows the difficulties of trying to change an architect's specifications. Some people may accomplish the apparent impossible but it is the exception rather than the rule. All of which leads to the point—that if you expect to sell the new home builder complete new approved modern gas equipment, it is necessary to get in on the ground floor. One very excellent method of beating the gun, as it were, is to contact the owner *before* the architect is called in to prepare the plans and specifications.

"Make a regular habit of seeking property transfer information and it will pay bigger dividends than many of your daily practices. A person who has just purchased a piece of residential property for other than speculative purposes is usually in a receptive frame of mind and will listen to any sales talks which may assist him in making his proposed home more livable. If you succeed in painting a satisfactory picture the chances are that when Mr. Jones calls in the architect he will probably specify gas refrigeration, gas heating, etc., at the same time that he requests yellow and lavendar tile in the bathroom.

"Instead of relying on friends in scattered real estate offices to tip you off when recent deals were made, get the complete property transfer information from one central source; usually the Realty Board in your communities. Most Builders' Exchanges supply their members with this data, listing the properties which have changed hands during the previous week and usually including legal description, name of seller and the name and address of the buyer. Whether the property purchaser intends to build at once or later, your call will result in a valuable contact and at the same time enable you to get in a lot of good hard 'licks' before your competitor arrives on the scene."

—Justin M. Kennedy

Bring the Billboard Inside

"DURING Gas Range Week recently conducted in Northern California, two of the larger furniture stores of Oakland—Breuner's and Jackson's conceived the novel idea of linking up with the outdoor advertising campaign being carried on jointly by the Pacific Gas and Electric Company and the Pacific Coast Gas Association.

"These billboards, some 60 in number and scattered throughout the San Francisco Bay area, depicted the advantages of cooking with the modern fuel—gas. Two lithographed copies of this sign were obtained from the outdoor advertising company and

by skillfully pasting the numerous sections onto a light cloth surface, a back drop was obtained which was hung on the back walls of large show windows in both stores. The effect was striking and attracted the attention of window shoppers. The stunt helped popularize the modern features of gas as well as interesting the passer-by in the newer types of gas ranges with which the window was filled.

"Putting the billboard in the display window, or on the display floor, is an idea which can be adapted wherever gas is exploited through outdoor advertising."

—Ernest W. Kimmell.

Bombard the Prospect with Sales Literature

HERE is one way of wearing down sales resistance and making it hot for competitive fuels:

"It is a good idea from time to time to make up a list of all places using other fuels than gas—for example, all hotels and restaurants that use other fuels than gas

for cooking. A list is made and a copy sent to all of the equipment houses selling gas ranges and also to the range manufacturers, with the suggestion that circulars be mailed

Apply This Test to Your Sales Wrinkle

THE TEST of an idea is—whether it works. Sales stunts may seem brilliant on paper, and still fail miserably in the field. The kind of ideas WESTERN GAS wants for the Sales Wrinkle Department are those which have been put in service and have produced.

If you have developed a wrinkle of this sort—or know of one in use elsewhere—it's worth $10 when published in these pages.

This month's wrinkle contributors:

Ernest W. Kimmell, Pacific Gas and Electric Company, Oakland, California.

Justin M. Kennedy, Southern Counties Gas Company, Santa Monica, California.

D. J. Bartelme, Pacific Gas and Electric Company, San Francisco, California.

describing their equipment. The result is that the prospect receives circulars on almost every type of gas range, describing its good points, and in some cases the equipment houses have their salesmen call on a set number of the prospects each week.

"When the salesman from the gas company calls, he finds the prospect is fairly interested in one type of range or other, which naturally breaks down the sales resistance.

"This is one way of getting the help of a lot of salesmen without building up your payroll. The results are mutually good, for the gas company and for the manufacturer or equipment house."

—D. J. Bartelme.

"STARGAS SPARE TIME CONTEST" FOR LONE STAR EMPLOYEES

The Stargas Department of the Lone Star Gas Company has announced a "Stargas Spare Time Contest" which will be conducted between July 12 and September 12, in which every employee of the Lone Star group with the exception of those in the Stargas department can participate.

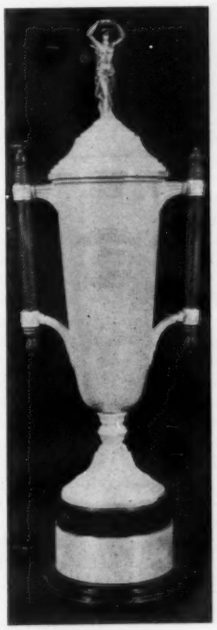
At the close of the contest cash prizes will be given to employees who develop statisfactory sales of Stargas installations. A grand prize will also be given the Stargas salesman who completes the most sales.

By the rules of the contest the employee works-up the demand for the installation to where the prospect requires detailed information. The employee is then permitted to call in the services of a regular Stargas salesman to help close the sale. The Stargas salesman is only required, under the ruling, to make one call on each prospect. Each employee-prospect must reside in the same territory as the employee, and each sale must be promoted in spare time.

Employees of the Lone Star, Dallas Gas, Fort Worth Gas, Municipal Gas, Community Natural, Texas Cities and Stamford & Western Gas Companies will participate in the campaign, which will be directed by J. W. Martin, sales manager of the Stargas department.

Wade Trophy *to* Inspire So. Counties Sales

AT the monthly sales dinner and meeting of the Southern Counties Gas Company, held in June at the general offices of the company in Los Angeles, F. S. Wade, president and general manager, announced his donation of a silver cup to the Commercial Department, for a merchandising trophy.



The cup bears the inscription, "Merchandising Trophy, Presented by F. S. Wade, President." It will be presented at the end of each month to the district selling the greatest percentage of its quota, and will be permanently awarded to the district successful in winning it three times.

Competition for the trophy dates from June first, and the first presentation will be made at the July sales meeting.

Southern Counties Gas Company reports that sales for the first five months of 1930 are in excess of $10,000 in advance of the same period last year.

NEW MERCHANDISING POLICY FOR TEXAS-LA. COMPANY

L. D. WITTKOWER, in charge of the merchandising department of the Texas-Louisiana Power Company of Fort Worth, has announced several changes in the merchandising policy of the company which particularly affect the set-up of the divisional offices. The company serves gas and electricity in 145 towns in Texas and Louisiana, gas being distributed at Ranger, Breckenridge, Woodson, Eliasville, Graham, Nacona, Gainesville and Kermit in Texas.

Under the new policy the general office of the company at Fort Worth will continue to direct the merchandising activities in the various districts operated by the company, but will place a greater responsibility upon the divisional managers and divisional commercial managers than heretofore exercised.

By the new plan the divisional managers and divisional commercial managers will be allowed to select the makes of appliances which shall be merchandised in their districts.

Once each year the division managers and division commercial managers will come to the company's headquarters and cast their ballot for the merchandise to be sold in their district.

Each district office will have its own advertising appropriation which will be a part of the general appropriation of the company.

It is also planned to keep the divisional managers of the company informed each month as to the number of meters in their towns, amount of gross gas sales during the month; and show a comparison of the previous month's business. The divisional men will also be notified each month as to their standing in sales.

Meetings of divisional managers, divisional commercial managers and local managers will be held every three months at the company's headquarters at Fort Worth.

Mr. Wittkower has recently added the merchandising managership of the electrical department of the company to his activities.

H. R. BASFORD CO. OF S. F. TAKES OVER RUUD AGENCY

Effective July 1, the Los Angeles agency of the Ruud Heater Co. will be operated by the H. R. Basford Co., of San Francisco. The Los Angeles manager will be D. E. Douglas, who was for a number of years with the late Otto Neisser when he handled the Ruud account in that territory.

Gas Service Company New Business Men Convene *for* Annual Conference

A meeting of the new business managers of the Gas Service Company, which stressed the putting forth of greater sales effort, was held at Hotel Baltimore in Kansas City, June 6. The meeting, a semi-annual affair was attended by approximately 65 new business managers, new business supervisors and engineers from the company's system.

B. C. Adams, general manager of Gas Service Company, brought the inspirational address. He praised the men for what had been accomplished during the past and urged upon them the need for a greater sales effort, for the future.

The morning session of the meeting was largely given over to a discussion of house-heating activity on which the Gas Service properties will concentrate for the year.

Another topic discussed at the meeting was the group sales plan which was placed in effect following the winter meeting. The group sales plan has been a big success and the plan will be continued permanently in connection with new business activities.

F. M. Rosenkrans, new business manager of the company, presided at the meeting.

New business managers, new business supervisors, and engineers of Gas Service Company, at Kansas City meeting, June 6.

Law *and* Economics Call *for* Same Rate Forms

To say a customer can use gas or not, as he chooses, at the rate which is enforced by the company, is, in my estimation, a poor alibi. If his relinquishment of his service is due to the fact that he is being forced to pay through the form of rate an amount which is greater than the cost which he creates, I say he has had a property right confiscated, and the fact that the rate as a whole is no more than compensatory to the company is in my opinion no legal defense, because it is confiscatory as applied to some customers and discriminatory as applied to all.

In every state of rate progress that has been made up to date, starting with flat rates, straight meter rates, straight meter rates with a minimum bill, customer charge rates, and on down the line through other more refined rate forms, there has always been discrimination. There has always been some measure of confiscation, but with each step both the confiscatory features and the discriminatory features of rates have been constantly minimized.

Let us consider another angle of the economic features of rate forms. I was not long ago retained in a rate case by a manufactured gas company having 700,000 customers. I found in that situation that during a period of eight years the number of customers had increased 22 per cent; the number of restaurants 199 per cent; laundries 116 per cent; and delicatessen stores 138 per cent. I found that in 1920 in the territory of this particular company a certain number of permits had been issued for buildings to be used for residential purposes. I tabulated those permits as one for a one-family house, as two permits for a two-family house and as 40 for a 40-family apartment building, and I found for the year 1920 that 78 per cent of those permits so tabulated were for one- and two-family houses and 22 per cent for families accommodated in apartment buildings. I then took the permits in the same manner for the year 1928 and I found that permits for one-family and two-family houses constituted 22 per cent, and for families accommodated in apartment buildings, 78 per cent of the total permits.

This company had had a straight meter rate down through this period of years, the justice of which to either the company or the customers as a group I shall not attempt to defend. It was necessarily discriminatory and confiscatory because of the fact that it was a straight meter rate. Going back to the word "unjustly" discriminatory, it would not have been so 20 years ago, because it was then the best known form of a rate. Because of better analyses and cost allocation it is now a rate which comes under the heading "unjust."

Shifting Habits

When the change in living conditions which these figures reflect is considered it is more than ever evident that the straight meter rate violates both the law and all rules of economics. We will assume that in 1920 the rate was not more than sufficient to give a compensatory return on the investment as an over-all proposition. Let us follow this rate down through the years to prove that it was discriminatory. It was obvious that the inhabitants of this territory were changing their living conditions and that greater and greater numbers were moving into apartments. Every time someone moved from a one-family house into an apartment, it is obvious that he ceased using gas for water heating. Coal in the basement boiler in the apartment house heated his water from then on. Everyone familiar with the manufactured gas business knows that the loss of water heating business constitutes a loss of more than half of the domestic consumption.

(Continued from Page 26)

It must also be obvious that the increase in the number of restaurants so disproportionately large in proportion to the increase in the number of customers must be due to the fact that people were eating more and more of their meals out of their homes. It must be equally obvious that the use of gas in restaurants results in less gas being used per meal than would be true if meals were cooked at home, so that even if it is assumed that all the restaurants were using gas, the total consumption would have dropped here. In a manufactured gas territory many hotels and restaurants have coal ranges, so that another portion of the load was here lost.

When we come to the delicatessen store we have a still more aggravating problem. The ordinary delicatessen store carries bread baked in wholesale lots, with a lower consumption of gas per loaf than is possible in the home, even if gas is used. The delicatessen store carries canned peas, canned corn, canned tomatoes and many other things that are cooked out where the product is grown and where gas is not available for fuel. The delicatessen stores today provide one with a cooked ham in a can, which ham was cooked at Hornell, New York; or a prepared chicken in a can, and so on down through the other items of food, the preparation of which provided no load for the gas company. The fact that while the company added 22 per cent in the number of customers during a given period while there was an increase of 138 per cent in the number of delicatessen stores in the same territory shows that more and more of the foods used in that territory were being prepared outside the city limits, and that, therefore, less and less gas was being used for cooking in the homes served.

At the end of this period the gas company finds itself in a position where its rate remains the same, where its production costs due to improvements in the art have been reduced in terms of cost for each thousand cubic feet, but where its net from operation in terms of percentage on investment has been decidedly reduced.

If there had been in effect a compensatory and non-discriminatory rate, adding customers with the resulting added sales would have kept the net from operation bearing the same relation to the investment which it did in the earlier years, providing production costs remained about where they were. The fact is that customers were added, sales were increased, production costs went down, and because of the discriminatory nature of the straight meter rate the net from operation in terms of percentage to investment was reduced during these same years.

It costs no more for the company from which I obtain gas service to have my meter read, to compute the amount of my bill, to post that amount on its books and collect that account than it does to render the same service to some toast-eater occupying a three-room apartment, with no children and whose wife is too much of a bridge expert to have time to prepare meals at home. I am just as much entitled to the protection of the courts against the enforcement of a straight meter rate which must necessarily through my greater consumption make me pay the deficit created by the toast-eater as is the company entitled to the protection of the courts against having regulatory bodies enforce a rate which does not allow the company sufficient to maintain its credit standing in order to give all of us service. From the standpoint of the customers as a whole another fact must be given fair consideration. The habits of living of people within the cities in America are very rapidly changing, as is evidenced by the continually increasing rapidity with which people are abandoning homes where they did their own laundry work, cooked their own meals and heated their own hot water, in favor of apartment buildings where they send out their laundry work, where they buy their meals or a portion of their meals in restaurants or delicatessen stores, and where their water is heated by coal in the basement of the building in which they reside.

The economic law forces either one of two things under such a condition, either the adoption of a non-discriminatory form of rate, containing a customer charge which is in proportion to the number of customers attached and the consumption charge which is proportionate to the amount of gas consumed, or a receivership for the company due to a lack of fair return, which will make it impossible for any of us to get adequate and satisfactory service.

The law in turn prohibits an "unjustly discriminatory" rate or a confiscatory rate, and we should bring cases before the courts as private citizens to prevent the unjust discrimination and confiscation which must be in effect wherever a straight meter rate is collected.

Added Investment

It is only with the change in living conditions and within the last two or three years that the manufactured gas companies have awakened to the fact that the discriminatory nature of their rates was making it necessary to add tremendous investment to take care of service to the additional number of customers which growth in population was bringing onto their lines. At the present time the lighting portion of the load of the manufactured gas company amounts to practically nothing. Yet the rates that have come down through time, which were originally installed when the lighting load was the important feature of the gas business, are heading those companies straight for receiverships unless they can get them changed to a non-discriminatory form of rate.

To members of the natural gas industry I say in all earnestness that a lesson should be drawn from the experience of the manufactured gas companies, and simply because the heating load shares largely with the water heating and cooking loads on a natural gas property is no reason why the company should not put its house in order for changes which may affect its business.

A confiscatory rate will make it impossible for natural gas properties to render the ser-

vice which they are obligated to render and nothing but a non-discriminatory rate will enable them down through the years to do business under the conditions which in this country we can thankfully say are always changing.

Only by adoption of such a rate form can gas utilities obey the law of the land, and only by the adoption of such a rate form can they make their business permanently successful. The most unfortunate attribute of the old straight meter rate was that it made those customers who were most valuable, the ones which were most easily taken away by competitors.

So. Calif. Gas Co. Launches $6,000,000 Construction

SOUTHERN California Gas Company's program for increasing gas delivery facilities from San Joaquin fields to the Los Angeles metropolitan area gets under way on July 10, when construction is due to start from the Los Angeles end of the project. Included in the construction are the following items, which call for the expenditure of approximately $3,000,000 this year:

Seven and one-half miles of 22-inch pipeline will be laid from the terminus of the company's present 20-inch Kettleman Hills line at Buena Vista Junction, to Station 40, in the Buena Vista Hills field. This will make 80,000,000 cubic feet of gas available from Kettleman Hills daily. Station 40 will be changed from low pressure to high pressure service to handle this gas direct, increasing its capacity from 45 to 75 million cubic feet. A field compressor station will be erected at Buena Vista Hills, consisting of eight 160 h.p. compressor units. This station will handle local gas for San Joaquin Valley and Midway Field distribution.

Forty miles of 22-inch pipe will be laid over the Tehachapi Mountains paralleling the company's present 12-inch line. The line route is entirely mountainous, and construction will present unusual difficulties.

A new terminal station will be built just south of the town of Newhall.

From the Newhall terminal 17 miles of 22-inch line will be laid to the company's Ventura Boulevard junction, and from that point 10 miles of 26-inch pipe will run through Sepulveda Canyon to the Santa Monica terminal which the company will erect near Sawtelle.

Five miles of 16-inch line will be laid from the Ventura compressor station joining the company's present 12-inch line from Ventura.

Field survey work is already well advanced and with construction starting early in July it is estimated that the program will be complete and lines in service early in November.

The final project, the balance of which will be finished in 1931 will entail a total expenditure of approximately $6,000,000, and the total additional gas available from San Joaquin Valley fields will be 120,000,000 cubic feet daily. When complete, the construction will result in a 22-inch line extending south from Buena Vista junction to Ventura Boulevard junction, 110 miles, and 20 miles of 26-inch line via Santa Monica terminal, to the company's Station 3 in Los Angeles, a distribution terminal located at Slauson and Western Avenues. With the completion of the whole line in the fall of 1931 the company will be able to deliver 150,000,000 cubic feet a day into the Los Angeles metropolitan area from San Joaquin Valley fields.

Additional compression facilities will be installed at Station 40 in 1931.

H. P. George and Elting Henderson, general superintendent and assistant superintendent of natural gas production and transmission for the Southern California Gas Company, will direct the construction operations. Active field supervision will be in charge of C. M. Cole and B. M. Laulhere, superintendent and assistant superintendent of construction.

A. J. HARDENDORF GETS FRANCHISE AT SYRACUSE, KANSAS

A. J. Hardendorf, of Dodge City, Kansas, has been granted a gas franchise in Syracuse, Kansas. The town is to be served through a 6- or 8-inch line which will tap a larger line near Johnson. It is also proposed to extend the tap line as far west as Lamar, Colorado. Mr. Hardendorf is an official of the Argus Gas Company, which has headquarters in Dodge City.

Contact Man *for* Houston Gas and Fuel Co.

A NEW office has been created by Houston Gas and Fuel Company, Houston, Texas, designed to promote pleasant contacts between customers of the organization and its personnel. Judson Smith has been appointed contact man for the Customers' Service Department. His duties in this post will follow no set rules, but he will do anything to aid customers from the time they enter the offices of the company until they leave. He stands near the main entrance of the lobby where customers pass in and out. If any one looks uncertain as to where to go, Mr. Smith either directs or accompanies the caller to the desired desk. As the customer leaves the office Mr. Smith enquires if she has obtained the service sought. If there is a complaint, it is his duty to do everything possible to straighten out the difficulty and see that the customer leaves the office entirely satisfied.

Judson Smith

The service of this position differs from the information desk in two outstanding ways. In the first place, the contact man may, if necessary, sell merchandise displayed on the sales floor; he can sign up a gas service, or he can aid in adjusting any complaint. He approaches every customer entering the building whom he can possibly reach, and makes each feel a personal interest in the utility.

IOWA-NEBRASKA LIGHT & POWER ASKS LINCOLN FRANCHISE

An ordinance granting the Iowa-Nebraska Light & Power Company, a subsidiary of the United Light & Power Company, a franchise to operate a natural gas system in Lincoln, was submitted to the commissioners of the city early in June.

The Iowa-Nebraska company which supplies manufactured gas at Lincoln and other towns in Nebraska, has natural gas franchises pending in June in Plymouth, Friend, Pawnee City and a number of other cities.

Community Nat. Personnel Changes Announced

CHESTER L. MAY, vice-president of the Community Natural Gas Company has announced the following appointments in effect on the Stamford & Western Gas Company system, which was recently purchased by the Lone Star Gas Corporation, parent company of the Community.

Community Natural, of which F. L. Carmichall is superintendent, will have charge of the operation of Stamford & Western system.

J. E. Furneaux has been appointed agent for the Stamford district, and will maintain district offices at Stamford. He will also have charge at Anson. Sub-agents in the Stamford district are Amos Jackson and William Braymer. The former will maintain headquarters at Haskell, from which he will also have supervision of Rule. Mr. Braymer will be located at Hamlin, and will supervise Roby and Rotan.

C. W. Thorp has been appointed agent of the Seymour district and will have under his charge Seymour, Vera, Red Springs, Benjamin, Truscott, Gilliland, Rhineland. P. W. Bryan is sub-agent and will have charge of Munday Goree, Knox City, O'Brien, Weinert, Rochester and Margaret.

L. D. Black has been appointed as agent at Sweetwater, on the Community system, taking the place left vacant by Mr. Furneaux, and is succeeded as agent at Colorado by H. P. Mann, formerly of Eastland. H. V. Smith succeeds C. W. Thorp at Georgetown.

APPALACHIAN GAS CORP. BUYS SOUTHWESTERN NATURAL

Appalachian Gas Corporation has announced the purchase of 75 per cent of the common stock of the Southwestern Natural Gas Company, which has long term contracts to supply gas to companies distributing natural gas in Muskogee, Sapulpa and Boynton, in the eastern section of Oklahoma.

Upon completion of financing now being arranged, the company will construct approximately 112 miles of gas transmission system extending from the Quinton, Oklahoma, fields to these towns.

The company has a long-time gas purchase contract with the Utilities Production Corporation, subsidiary to the Utilities Power & Light Corporation, which has extensive gas rights in the Quinton gas fields. By the terms of the contract the entire gas requirement of the company up to 40,000,000 cubic feet daily will be supplied.

The company expects to make deliveries at Muskogee, Okla., some time the first of September, and the entire line will be completed a month later. It is planned, also, to serve certain industrial customers direct in Tulsa. A compressor station is to be constructed by the company by 1931.

The Appalachian Gas Corporation which operates under Union Management and Engineering Corporation, has recently acquired one-third interest in the Memphis Natural Gas Company.

Texas Gas Utilities Company, which is constructing a gas line from the Rycade gas field in Maverick county, Texas, to serve Del Rio, and other towns in the section, is also subsidiary to the Appalachian Gas Corporation. This line, which will be approximately 63 miles in length, is expected to be completed in July.

Officers of the Appalachian Gas Corporation are H. G. Scott, president; Frank Durlbutt, secretary, and Carl Bauman, treasurer.

Fuel Data *in* Distribution Census

By FRED E. BERQUIST

Statistician for Census of Mines and Quarries
United States Bureau of the Census

PRELIMINARY estimates for 1929 indicate that approximately 608,990,000 tons of coal, 1,006,000,000 barrels of oil, and 2,300 billion cubic feet of gas were produced by some 6,600 mines and 350,000 wells and manufacturing establishments. The facts of production of these products are ascertained annually by the United States Bureau of Mines. However, accurate and complete statistics of distribution and consumption of these commodities have never been compiled along the lines and in such detail as is contemplated by the current Census of Mines and Quarries.

Fred E. Berquist

How much fuel, by kinds, is consumed in each county? In each city of over 10,000 population? How much is consumed by various industries, by public utilities, by railroads and domestic consumers? Through what marketing channels are these commodities sold and what are the facts of wholesale and retail trade in them, such as volume of sales, number of outlets, persons engaged, stocks, etc.?

The Bureau of the Census this year, in a large and comprehensive canvass, is gathering the data which will answer these and many other questions. First and foremost of these questions of interest to the coal industry are data of the total consumption of coal and other fuels by small geographic units—by counties, and by cities of over 10,000 population, (excepting railroad consumption, which will be presented by regions, as reported to the Interstate Commerce Commission). Heretofore, the Census Bureau has compiled data for the consumption of fuels only for manufacturing and mining and quarrying industries. These data in the past have been tabulated and presented in tables by States. The present undertaking will be as nearly complete for the consumption of fuel for all uses as it is possible to make it. The presentation of the statistics to show consumption by smaller geographic units—counties and cities—will, in consequence, have far greater value as an aid in studying marketing and distribution problems.

These figures will be made up from industry reports to the Census of Manufactures, mines and quarries reports to the Census of Mines and Quarries, electric utilities reports to the Geological Survey, and the reports of coal retailers to the Census of Distribution. The accuracy of these county and city statistics as well as their early publication is dependent upon the care and promptness with which the individual census reports are prepared and returned by manufacturers, mine and quarry operators, coal dealers, and others from whom reports are required.

More specifically as to the value of this Census, the gas producer will learn of the magnitude of his fuel-consuming areas. He may learn what portion of the fuel consumed is supplied by him, and how gas fares in competition with other fuels—from county to county, and from city to city. He may learn how his marketing channels compare with others in his section as well as those in other areas. These facts should help him as well as the producing industry as a whole to market gas more efficiently and economically.

As to the manufacturer, mine or quarry operator, public utility, and other consumers of fuel who are required to report their consumption—what of them? The answer is that any information which may assist in efficient and orderly marketing of fuels should produce favorable results for the consumer in the long run—assured supply, better service, lower and more stable prices, and better standards.

The published reports containing this material will be made available to the industry as soon as possible after all industrial establishments have prepared and returned the required reports to the Census Bureau. Accurate, complete, and prompt returns from each and every establishment will insure valuable and timely information for the industry. It is also hoped that preliminary statistics may be published in advance of the final reports.

The work of the Census Bureau is to gather, compile and disseminate information for the welfare of all the people. All information is treated confidentially—in fact, no disclosures are allowed which will reflect or expose the operation of any single establishment. The information reported may not be used for taxation of inquisitorial purposes.

There *Is* No Royal Road *to* Sales

(*Continued from Page 36*)

preceded by the sale of a gas appliance. In most cases we do not sell gas at all; we sell the appliance and the service that appliance can render. If we sell, or permit to be sold, appliances which will not render the desired service, we can have no hope of building up our gas load. It is essential that the gas company give a great deal of thought to the appliances sold to its customers and that the company have in its employ men who are expert in design and maintenance of gas appliances.

The question of who shall sell appliances, the company or the dealer, has received a great deal more discussion than it deserves. It is evident that it is advantageous to a gas company to have every plumber, hardware store and furniture store selling gas appliances and boosting gas. It is also evident that it is advantageous to the merchant to have the gas company selling gas appliances, as the resultant advertising and creative sales effort will most certainly increase his sales. The merchant needs only to use care in selecting serviceable appliances for his stock and the gas company to realize that the merchant is a valuable sales outlet, to create an atmosphere of harmony and cooperation.

Like most problems, this sales problem is one that has general fundamentals which apply universally, and specific differences which are created by local conditions. The Pacific Gas and Electric Company is introducing natural gas and this has opened up markets not available to us heretofore. The principle of discovering and acquiring these markets, however, has not changed. Surveys of various communities which we serve show that where in one we can do best by concentrating on gas for cooking, in another most people already cook with gas and an increase in business could only be secured by a sales expense excessive in proportion to the cost of securing water heating business.

Recent survey work conducted by the Pacific Gas and Electric Company has developed some interesting facts on the character of present and potential business at various points on the company's system. Fig. 1 presents percentages based on domestic use of gas and other fuels.

In sales there is no royal road to success —one must know the fundamentals—one must work to get the facts—and work to apply them both. If this is done success will come and be all the sweeter for having been earned and deserved.

LONE STAR TRANSFERS FOUR TO OMAHA DIVISION

C. F. Wilson, supervisor of stores for the Lone Star Gas Company, who is installing the Lone Star's stores system for the Missouri Valley Pipe Line Company, with headquarters at Omaha, has announced the transfering of the following men to the Omaha company:

C. F. Martin, assistant supervisor of stores for the Lone Star, has been appointed as assistant purchasing agent and supervisor of stores for the Missouri Valley company, and will make his headquarters at Omaha.

Harry Appling, formerly district storekeeper for the Lone Star at Ranger, Texas, and Ernest White, storekeeper at Shamrock, Texas, have been transferred as district storekeepers for the northern and southern units of the line, respectively; and Lee Williams, formerly storekeeper for the construction of the Brad compressor station, has been transferred to the same position at the compressor station being constructed on the Missouri Valley line, at Clifton, Kansas.

A.G.A. SENDS REPRESENTATIVES TO WORLD POWER CONFERENCE

The American Gas Association is being represented at the World Power Conference, Berlin, Germany, by three delegates, A. M. Apmann and J. S. S. Richardson of New York, and C. J. Ramsburg, of Pittsburgh. The Conference opened June 16.

J. C. KENNEDY PRESIDENT OF AMERICAN PUBLIC SERVICE CO.

James C. Kennedy of Dallas, was recently elected president of the American Public Service Company, succeeding Martin J. Insull. Mr. Kennedy is president of the Central and Southwest Utilities Company.

Natural Gas Totals *at* New Levels

By G. R. HOPKINS
and
H. BACKUS

U. S. Department of Commerce
*Bureau of Mines**

Summary

THE steady growth of the natural-gas industry was continued in 1928, when the consumption reached the new peak of 1,567,979,000,000 cubic feet, valued at $363,631,000. These figures represent increases over 1927 of 8 per cent in quantity and 14 per cent in value. It is worthy of note that the percentage increase in quantity of gas is very close to the increase in number of gas wells completed—2,727 wells in 1928 compared with 2,491 in 1927, an increase of 9 per cent. A material expansion in pipe line facilities was reflected in an increase in the number of domestic consumers—from 3,984,000 in 1927 to 4,366,000 in 1928. The average price paid for natural gas by domestic (household) consumers increased for the twentieth successive year and amounted in 1928 to 62 cents per thousand cubic feet. The total quantity of natural gas used for industrial purposes increased, but the quantity consumed by refineries decreased as a result of the displacement of natural gas in some localities by low-priced fuel oil. Although the use of natural gas for field purposes constituted the largest single item among the industrial uses listed, the consumption of natural gas by carbon-black manufacturers made much the largest actual gain in 1928. After declining in 1927, the interstate movement of natural gas in 1928 rose to the new high level of 241,386,000,000 cubic feet. This increase was an aftermath of the expansion program of the industry in 1928, as typified by the growth in trunk-line mileage between States.

Summary of statistics for natural gas in the United States, 1924–1928

	1924	1925	1926	1927	1928
Natural gas consumed.					
Domestic—millions of cubic feet	285,152	272,146	289,175	296,036	320,877
Industrial [a]—					
Carbon black—do	156,514	140,366	130,321	144,087	175,137
Field—do	393,437	423,524	478,188	549,455	573,698
Electric public-utility power plant fuel—millions of cubic feet	48,443	46,521	53,207	62,919	77,326
Refinery fuel—do	257,936	87,842	121,449	123,395	114,950
Other industrial—do		218,040	240,513	269,352	305,991
	1,141,482	1,188,439	1,312,853	1,445,244	1,567,979
Domestic—per cent	25	23	22	20	20
Industrial—do	75	77	78	80	80
Treated for natural gasoline:					
Millions of cubic feet	1,016,276	1,040,390	1,206,300	1,341,248	1,473,434
Per cent of total consumption	89	88	92	93	94
Domestic consumers—thousands	3,443	3,508	3,731	3,984	4,366
Value of natural gas at wells:					
Total—thousands of dollars	105,779	112,047	124,693	127,468	139,898
Average per M cubic feet—cents	9.3	9.4	9.5	8.8	8.9
Value of natural gas at points of consumption:					
Total—thousands of dollars	253,830	265,184	300,055	317,803	363,631
Domestic—do	154,075	152,494	168,870	180,018	198,808
Industrial—do	99,755	112,690	131,185	137,785	164,823
Average per M cubic feet—					
Domestic—cents	54.0	56.0	58.4	60.8	62.0
Industrial—do	11.6	12.3	12.8	12.0	13.2
Domestic and industrial—do	22.2	22.3	22.9	22.0	23.2
Natural gasoline:					
Quantity—thousands of gallons	933,861	1,127,470	1,363,090	1,641,144	1,814,034
Value at plants—					
Total—thousands of dollars	82,233	120,383	136,412	118,688	138,944
Average per gallon—cents	8.8	10.7	10.0	7.2	7.7
Carbon black:					
Quantity—thousands of pounds	186,872	177,417	180,576	198,429	248,790
Value at plants—					
Total—thousands of dollars	11,565	9,640	9,939	10,955	13,782
Average per pound—cents	6.2	5.4	5.5	5.5	5.5

[a] Figures on consumption by public utilities from U. S. Geological Survey; others partly estimated.

Production and Consumption

The total production of natural gas in the United States during 1928 amounted to

Statistics of natural gas in the United States, 1906–1928

Year	Produced and delivered to consumers (billions of cubic feet)	Treated for recovery of natural gasoline: Billions of cubic feet	Treated for recovery of natural gasoline: Per cent of total consumption	Domestic consumption: Number of consumers (thousands)	Domestic consumption: Billions of cubic feet	Domestic consumption: Average number of M cubic feet used per consumer	Domestic consumption: Per cent of total consumption	Domestic consumption: Average value at points of consumption per M cubic feet (cents)	Industrial consumption [1]: Field (billions of cubic feet)	Carbon black (billions of cubic feet)	Refineries (billions of cubic feet)	Electric public-utility power plants (billions of cubic feet)	Other industrial (billions of cubic feet)	Total industrial (billions of cubic feet)	Per cent of total consumption	Average value at points of consumption per M cubic feet (cents)
1906	389	[2]	[2]	875	110	126.2	28	22.7	[2]	[2]	[2]	[2]	[2]	279	72	7.8
1907	407	[2]	[2]	1,058	132	124.2	32	23.7	[2]	[2]	[2]	[2]	[2]	275	68	8.4
1908	402	[2]	[2]	1,166	141	120.6	35	23.6	[2]	[2]	[2]	[2]	[2]	261	65	8.2
1909	481	[2]	[2]	1,223	151	123.6	31	24.2	[2]	[2]	[2]	[2]	[2]	330	69	8.1
1910	509	[2]	[2]	1,328	170	127.9	33	24.4	[2]	[2]	[2]	[2]	[2]	339	67	8.6
1911	513	2		1,498	175	117.1	34	25.3	[2]	[2]	[2]	[2]	[2]	338	66	9.0
1912	562	5	1	1,623	193	119.2	34	26.3	[2]	[2]	[2]	[2]	[2]	369	66	9.1
1913	582	10	2	1,911	185	96.8	32	27.3	[2]	[2]	[2]	[2]	[2]	397	68	9.4
1914	592	17	3	2,078	203	97.8	34	28.0	[2]	[2]	[2]	[2]	[2]	389	66	9.6
1915	629	24	4	2,195	217	98.9	35	28.3	[2]	[2]	[2]	[2]	[2]	412	65	9.7
1916	753	209	28	2,352	235	99.6	31	28.6	[2]	[2]	[2]	[2]	[2]	518	69	10.2
1917	795	429	54	2,431	258	106.2	32	30.8	[2]	[2]	[2]	[2]	[2]	537	68	11.7
1918	721	449	62	2,509	271	108.1	38	31.4	[2]	[2]	[2]	[2]	[2]	450	62	15.2
1919	746	480	64	2,501	256	102.2	34	34.6	170	50	[3]	21	[3] 249	490	66	14.8
1920	798	496	62	2,615	286	109.4	36	38.2	202	41	[3]	25	[3] 244	512	64	17.0
1921	662	465	70	2,631	248	94.4	38	44.4	182	51	[3]	24	[3] 157	414	62	15.5
1922	763	545	71	3,015	255	84.4	33	49.9	198	54	[3]	27	[3] 229	508	67	18.6
1923	1,007	876	87	3,234	277	85.7	28	51.4	343	109	[3]	31	[3] 247	730	72	13.4
1924	[4] 1,142	1,016	89	3,443	285	82.8	25	54.0	393	157	[3]	48	[3] 258	856	75	11.6
1925	[4] 1,189	1,040	88	3,508	272	77.6	23	56.0	424	140	88	46	218	916	77	12.3
1926	[4] 1,313	1,206	92	3,731	289	77.5	22	58.4	478	131	122	53	240	1,024	78	12.8
1927	[4] 1,445	1,341	93	3,984	296	74.3	20	60.8	549	144	123	63	270	1,149	80	12.0
1928	[4] 1,568	1,473	94	4,366	324	73.5	20	62.0	574	175	115	77	306	1,247	80	13.2

[1] Figures on consumption by public utilities from U. S. Geological Survey; others partly estimated.
[2] Figures not available.
[3] Refinery fuel included under "Other industrial"; separate figures not available.
[4] Includes gas piped to Canada and Mexico.

*Natural gas statistics published in these pages are the latest compiled by the Bureau of Mines. Work on Mr. Hopkins' and Mr. Backus' manuscript for this review was completed in November, 1929, and the report came from the press on March 26, 1930, as Part II of the 1928 survey on Mineral Resources of the United States.

Natural gas produced in the United States and delivered to consumers, 1906–1928, by States, in millions of cubic feet

Year	Arkansas	California	Illinois	Indiana	Kansas	Kentucky	Louisiana	Montana	New York	Ohio	Oklahoma	Pennsylvania	Texas	West Virginia	Wyoming	Others	Total	Value at points of consumption	
																		Total (thousands of dollars)	Average per M cubic feet (cents)
1906	[1]	153	410	7,861	69,323	789	[2] 1,039	-------	2,548	45,436	3,520	138,161	[2]	119,400	[1]	203	388,843	46,874	12.1
1907	[1]	230	1,155	6,624	76,707	1,303	[2] 1,288	-------	3,288	52,041	4,867	135,516	[2]	122,687	[1]	916	406,622	54,222	13.3
1908	[1]	479	4,979	5,256	80,740	1,430	[2] 1,752	-------	3,843	47,442	11,925	130,476	[2]	112,181	[1]	1,638	402,141	54,640	13.6
1909	[1]	2,324	8,473	6,159	75,074	2,097	[2] 4,365	-------	4,696	53,223	28,037	127,697	[2]	166,435	[1]	2,126	480,706	63,207	13.1
1910	[1]	2,764	6,723	5,760	59,380	1,357	[2] 8,110	-------	6,010	48,232	50,430	126,867	[2]	190,706	[1]	2,916	509,155	70,756	13.9
1911	[1]	6,390	6,762	4,365	38,800	1,275	[2] 9,786	-------	5,240	49,450	67,276	108,869	5,503	206,891	[1]	2,386	512,993	74,622	14.5
1912	[1]	9,355	5,603	3,618	28,068	1,951	[3] 14,493	-------	8,626	56,210	73,799	112,150	7,470	239,007	[1]	1,853	562,203	84,564	15.0
1913	[1]	11,035	4,767	2,921	22,884	1,821	[3] 26,653	-------	8,515	50,612	75,018	118,860	12,160	245,454	[1]	1,198	581,898	87,847	15.1
1914	[1]	17,829	3,548	2,580	22,628	1,422	[3] 26,775	-------	8,935	68,270	78,167	110,745	13,434	236,489	[1]	1,045	591,867	94,116	15.9
1915	[4] 992	21,891	2,690	2,261	27,046	1,667	25,540	6	7,977	79,510	87,517	113,692	13,324	244,004	[1]	462	628,579	101,312	16.1
1916	2,388	31,643	3,534	1,715	31,710	2,107	32,081	213	8,036	69,888	123,517	130,484	15,810	299,319	[1]	725	753,170	120,227	16.0
1917	5,610	49,427	4,439	1,712	24,439	2,802	31,287	334	8,372	68,917	137,384	133,397	17,047	308,617	[1]	1,326	795,110	142,089	17.9
1918	5,295	39,719	4,473	1,667	27,825	3,022	36,094	177	8,461	61,261	124,317	123,813	13,440	265,161	4,339	1,937	721,001	153,554	21.3
1919	5,587	55,607	3,825	1,407	16,150	2,057	47,062	858	8,124	63,153	163,649	113,489	24,710	234,095	6,014	129	745,916	160,888	21.6
1920	9,027	66,041	3,013	1,779	21,158	3,345	58,274	818	8,419	58,938	154,467	125,787	37,063	239,719	10,312	50	798,210	196,194	24.6
1921	4,260	75,942	2,646	1,066	15,717	4,820	58,004	336	6,583	47,412	124,058	86,144	44,504	174,921	15,608	31	662,052	174,617	26.4
1922	9,700	84,580	3,383	947	20,289	5,872	70,267	486	6,947	51,481	140,631	101,276	47,945	195,288	23,427	27	762,546	221,535	29.1
1923	24,215	131,434	4,049	880	30,913	11,953	112,031	1,470	6,497	53,812	203,082	112,562	74,535	203,867	35,523	153	1,006,976	240,001	23.8
1924	36,616	189,692	4,072	998	25,580	12,875	160,945	1,071	6,196	47,396	214,452	105,863	107,247	182,285	46,036	197	1,141,521	253,856	22.2
1925	41,878	187,789	4,165	1,168	26,917	10,770	152,620	1,496	6,210	43,235	249,285	101,632	134,872	180,345	45,539	650	1,188,571	265,271	22.3
1926	43,566	204,915	3,808	901	38,095	10,410	157,423	2,283	7,027	47,363	286,421	107,089	175,392	180,223	46,567	1,536	1,313,019	300,168	22.9
1927	30,450	212,364	3,741	1,124	42,646	10,206	186,961	4,253	5,908	51,381	326,864	105,709	254,063	162,375	43,582	3,801	1,445,428	317,930	22.0
1928	20,235	246,215	3,051	1,290	45,644	15,383	227,821	6,277	7,224	56,341	320,861	99,466	301,990	163,018	47,490	5,833	1,568,139	363,726	23.2

[1] Included under "Others."
[2] Alabama and Texas included with Louisiana.
[3] Includes Alabama.
[4] Includes gas piped from Oklahoma and consumed in Arkansas.

Natural gas consumed in the United States, 1927–28, by States

State	Domestic				Industrial			
	Number of consumers	M cubic feet	Value at points of consumption		M cubic feet	Value at points of consumption		
			Total	Average (cents)		Total	Average (cents)	
1927								
Arkansas	57,190	6,419,000	$2,900,000	45.2	34,497,000	$2,851,000	8.3	
California	745,440	35,309,000	30,125,000	85.3	177,055,000	20,821,000	11.8	
Colorado	2,050	179,000	105,000	58.7	1,365,000	172,000	12.6	
Illinois	12,150	164,000	116,000	70.7	3,577,000	648,000	18.1	
Indiana	13,850	781,000	415,000	53.1	1,385,000	661,000	47.7	
Kansas	145,960	10,435,000	6,893,000	66.1	56,183,000	7,105,000	12.6	
Kentucky	141,890	11,448,000	4,917,000	43.0	5,246,000	691,000	13.2	
Louisiana	40,480	4,071,000	1,482,000	36.4	166,239,000	7,858,000	4.7	
Michigan	10	600	300	50.0				
Missouri	99,070	5,359,300	4,841,000	90.3	1,225,000	424,000	34.6	
Montana	7,700	1,775,000	763,000	43.0	3,680,000	155,000	4.2	
New Mexico	140	21,000	4,500	21.4	998,000	44,000	4.4	
New York	236,890	15,036,000	10,087,000	67.1	1,138,500	427,000	37.5	
North Dakota	30	2,300	1,300	56.5				
Ohio	1,149,760	83,654,000	52,038,000	62.2	28,949,000	12,220,000	42.2	
Oklahoma	193,660	22,298,000	10,532,000	47.2	264,187,000	22,971,000	8.7	
Pennsylvania	610,720	51,794,000	31,389,000	60.6	70,188,000	23,084,000	32.9	
South Dakota	400	92,000	136,500	148.4				
Tennessee	70	9,000	2,200	24.4				
Texas	328,510	20,517,000	14,019,000	68.3	249,427,000	26,122,000	10.5	
West Virginia	171,370	23,406,000	7,673,000	32.8	42,794,000	9,409,000	22.0	
Wyoming	12,780	2,638,000	1,070,000	40.6	39,921,000	2,010,000	5.0	
Other [1]	14,290	627,800	508,200	80.9	1,153,500	112,000	9.7	
	3,984,400	296,036,000	180,018,000	60.8	1,149,208,000	137,785,000	12.0	
1928								
Arkansas	61,840	6,785,000	3,281,000	48.4	30,978,000	3,366,000	10.9	
California	769,190	37,702,000	32,987,000	87.5	208,513,000	23,708,000	11.4	
Colorado	69,030	629,000	697,000	110.8	5,718,000	1,150,000	20.1	
Illinois	12,130	52,000	46,000	88.5	2,999,000	314,000	10.5	
Indiana	15,910	791,000	490,000	61.9	1,468,000	711,000	48.4	
Kansas	160,370	12,008,000	7,876,000	65.6	60,663,000	9,135,000	15.1	
Kentucky	140,520	10,753,000	4,874,000	45.3	5,049,000	1,594,000	31.6	
Louisiana	126,210	6,127,000	2,777,000	45.3	182,628,000	10,359,000	5.7	
Michigan	9,600	60,000	90,000	150.0	409,000	59,000	14.4	
Missouri	99,430	6,129,000	5,074,000	82.8	3,637,000	828,000	22.8	
Montana	13,180	2,346,000	1,010,000	43.1	4,919,000	514,000	10.4	
New Mexico	530	47,000	23,000	48.9	807,000	44,000	5.5	
New York	241,660	16,391,000	11,229,000	68.5	1,527,000	746,000	48.9	
Ohio	1,192,500	88,511,000	55,540,000	62.7	33,973,000	14,755,000	43.4	
Oklahoma	216,000	23,185,000	11,811,000	50.9	262,148,000	27,034,000	10.3	
Pennsylvania	615,360	52,971,000	32,409,000	61.2	63,179,000	21,979,000	34.8	
South Dakota	2,470	214,000	212,000	99.1				
Texas	420,060	27,284,000	18,305,000	67.1	291,434,000	35,965,000	12.3	
Utah					1,105,000	22,000	2.0	
West Virginia	171,690	25,407,000	8,394,000	33.0	41,865,000	10,237,000	24.5	
Wyoming	12,680	2,729,000	1,071,000	39.2	43,820,000	2,219,000	5.1	
Other [1]	16,040	756,000	612,000	81.0	263,000	84,000	31.9	
	4,366,400	320,877,000	198,808,000	62.0	1,247,102,000	164,823,000	13.2	

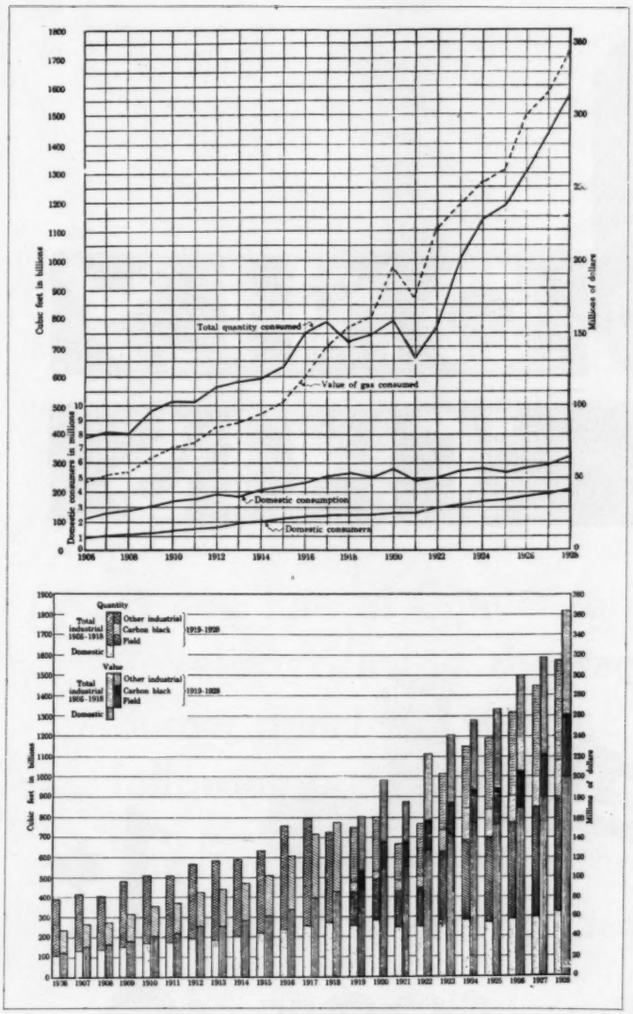
[1] 1927: Alaska, Maryland, Mississippi, and Utah, 1928: Alaska, Maryland, Mississippi, North Dakota, and Tennessee.

1,568,139,000,000 cubic feet, an increase over 1927 of 122,711,000,000 cubic feet or 8 per cent. This total does not include the large quantities of natural gas blown into the air incident to the production of oil in flush fields. Deliveries of natural gas to Canada and Mexico declined from 184,000,000 cubic feet in 1927 to 160,000,000 cubic feet in 1928; deducting the 160,000,000 cubic feet piped out of the country from the total production gives 1,567,979,000,000 cubic feet as the total consumption in the United States during 1928.

No material change occurred in 1928 in the rank of the larger natural-gas producing States. Production in Oklahoma fell off, but the State continued to hold first place ahead of Texas, where a material increase in output was recorded. Production in Louisiana increased 22 per cent in 1928; the increase placed the State within striking distance of California, which held third place. The largest relative decline occurred in Arkansas, where production fell off one-third compared with 1927 and was less than half the 1926 total. In the production of natural gas five States are preeminent, namely, Oklahoma, Texas, California, Louisiana, and West Virginia, and in 1928 these States accounted for 80 per cent of the total output for the country. Although this might indicate a centralization of the natural-gas industry in a few localities, the localization is not as pronounced as in the crude-petroleum industry, where three States—Texas, Oklahoma, and California—accounted for 82 per cent of the total output in 1928.

The total estimated value at wells of the natural gas produced in 1928 amounted to $139,898,000, an average of 8.9 cents per thousand cubic feet. This average compares with 8.8 cents in 1927 and 9.5 cents in 1926. The average prices charged for natural gas at the wells in 1928 ranged from 2 cents per thousand cubic feet in Utah to as high as 34.7 cents in Indiana.

The total value at points of consumption of the natural gas consumed (including gas piped to Canada and Mexico) in 1928 amounted to $363,726,000, an increase over 1927 of $45,796,000 or 14 per cent. The average value per thousand cubic feet at points of consumption was 23.2 cents in 1928, compared with 22 cents in 1927, an increase of 1.2 cents, or the same increase as



Upper: Fig. 1. Lower: Fig. 2

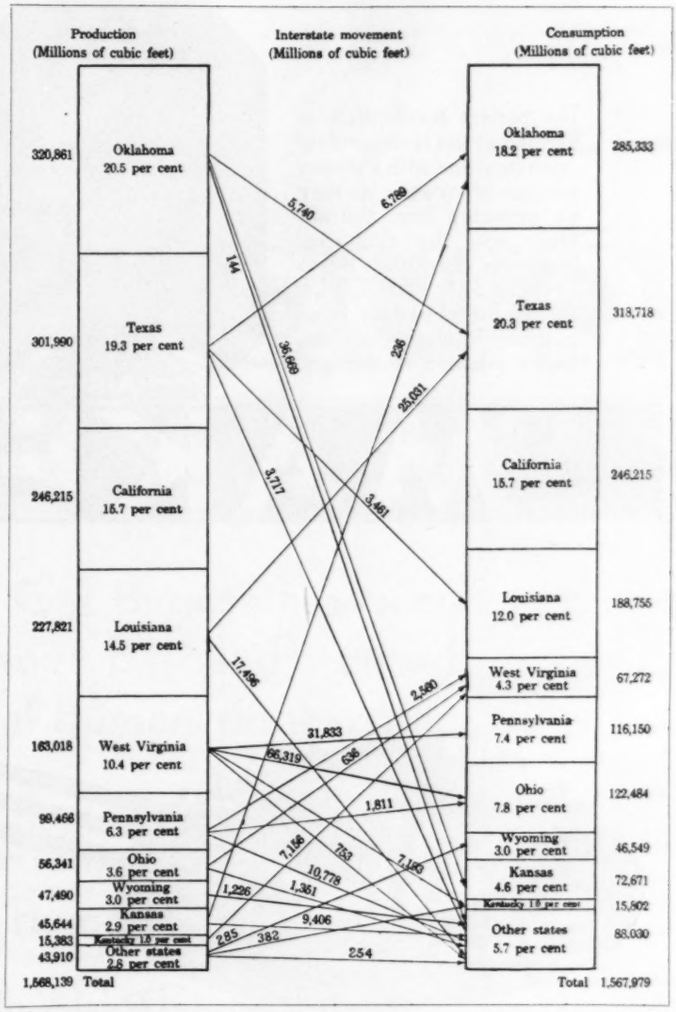

Production (Millions of cubic feet)
Interstate movement (Millions of cubic feet)
Consumption (Millions of cubic feet)
320,861 Oklahoma 20.5 per cent
301,990 Texas 19.3 per cent
246,215 California 15.7 per cent
227,821 Louisiana 14.5 per cent
163,018 West Virginia 10.4 per cent
99,466 Pennsylvania 6.3 per cent
56,341 Ohio 3.6 per cent
47,490 Wyoming 3.0 per cent
45,644 Kansas 2.9 per cent
15,383 Kentucky 1.0 per cent
43,910 Other states 2.8 per cent
1,568,139 Total
Oklahoma 18.2 per cent 285,333
Texas 20.3 per cent 318,718
California 15.7 per cent 246,215
Louisiana 12.0 per cent 188,755
West Virginia 4.3 per cent 67,272
Pennsylvania 7.4 per cent 116,150
Ohio 7.8 per cent 122,484
Wyoming 3.0 per cent 46,549
Kansas 4.6 per cent 72,671
Kentucky 1.0 per cent 15,802
Other states 5.7 per cent 88,030
Total 1,567,979

Fig. 3

in the price of gas for domestic (household) use. Although West Virginia ranked only fifth in production it was the leading State in total value at points of consumption, due to the fact that the major portion of the gas produced in the State is destined for domestic (household) consumption at a relatively high price, whereas the major portion of the gas produced in Oklahoma, for example, is used for field purposes at close to "at-the-well" prices.

Domestic Consumption

The total number of domestic (household) consumers increased from 3,984,400 in 1927 to 4,366,400 in 1928, or 10 per cent. (See Fig. 1.) The most important increases occurred in Colorado, following the completion of the Panhandle-Denver line; in Louisiana, after the opening of the Monroe-New Orleans line; and in Texas, following a general expansion of distributing facilities throughout the State. Michigan made a notable gain in number of consumers, following the development of considerable production near Muskegon. Ohio continued to lead in the number of domestic consumers and was again followed by California and Pennsylvania. Each of these three States reported an increase in 1928 in the number of domestic consumers, although in percentage of increase they were greatly exceeded by less important States through which trunk lines were laid during the year.

The total consumption of natural gas by domestic consumers in 1928 amounted to 320,877,000,000 cubic feet, or 20 per cent of the total consumption, and an increase over 1927 of 8 per cent. The average consumption per domestic consumer was lowered for the sixth successive year; it amounted to 73,500 cubic feet in 1928, as compared with 74,300 cubic feet in 1927. This decline may have been due to more efficient use, but had the new trunk lines been in operation the entire year it is probable that the average consumption would have increased.

The average price paid for natural gas by domestic consumers continued its slow increase and amounted to 62 cents per thousand cubic feet in 1928. This price compares with 60.8 cents in 1927 and 58.4 cents in 1926. On this basis of the consumption and price data given, the natural gas bill of the average domestic consumer in 1928 was $3.80 per month as compared with $3.76 per month in 1927 and $2.83 in 1918.

Industrial Consumption

The total consumption of natural gas for industrial purposes in 1928 amounted to 1,247,102,000,000 cubic feet, an increase over 1927 of 9 per cent. (See Fig. 2.) Of the total, 573,698,000,000 cubic feet, or 46 per cent, was used for field purposes (that is, for drilling, pumping, etc.); 175,137,000,000 cubic feet, or 14 per cent, was burned for carbon black; 114,950,000,000 cubic feet, or 9 per cent, was used for fuel in the refining of petroleum; and 77,326,000,000 cubic feet, or 6 per cent, was burned as fuel by electric public-utility power plants, leaving 305,991,000,000 cubic feet, or 25 per cent, for "other industrial" purposes.

The average price per thousand cubic feet paid for natural gas for industrial purposes in 1928 was 13.2 cents, as compared with 12 cents in 1927 and 12.8 cents in 1926. The increase in average price of gas for industrial use was due entirely to the reported increased price of gas for field purposes; in fact, the price of gas for industrial purposes other than field use declined from 16.5 cents per thousand cubic feet in 1927 to 15.8 cents in 1928.

The consumption of natural gas for field purposes in 1928 amounted to 573,698,000,000 cubic feet, an increase over 1927 of 24,243,000,000 cubic feet, or 4 per cent. California was credited with an increase of nearly 28,000,000,000 cubic feet in field use of natural gas in 1928, or more than the increase for the county as a whole. The other two major oil-producing States, Texas and Oklahoma, recorded but small increases in field use of natural gas—in Oklahoma, probably because of the decline in drilling, but in Texas, in view of the material increase in the number of completions in 1928, probably because some gas was displaced by fuel oil for field use. The total value of the natural gas sold for field purposes amounted

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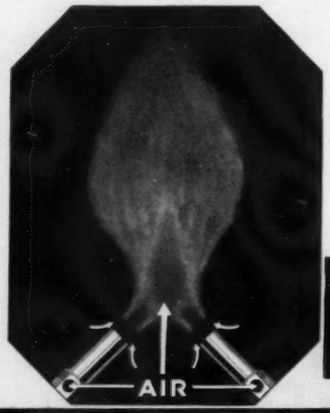

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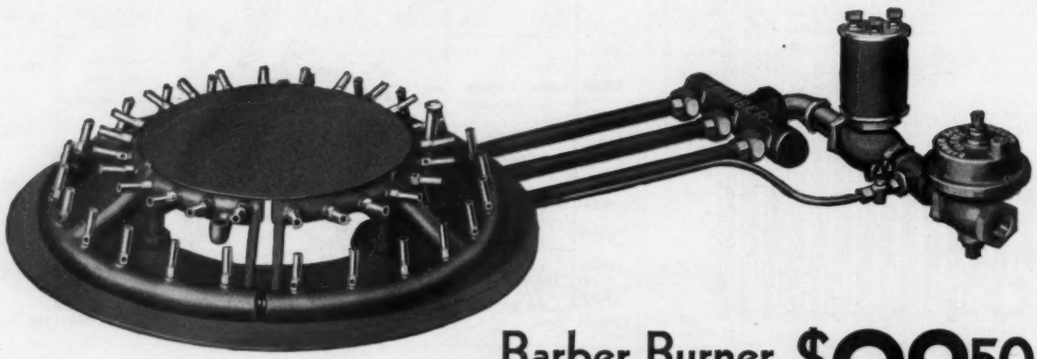

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Industrial consumption of natural gas in the United States, 1927–28, by States and uses

[Figures on consumption by public utilities from U. S. Geological Survey; others partly estimated]

State	Field (drilling, pumping, and operating gasoline recovery plants)		Manufacture of carbon black			Fuel at petroleum refineries, fuel at electric public-utility power plants, and other industrial				
				Value at points of consumption		M cubic feet			Value at points of consumption	
	M cubic feet (estimated)	Value at points of consumption (estimated)	M cubic feet	Total	Average (cents)	Petroleum refineries	Electric public-utility power plants	Other industrial	Total	Average (cents)
1927										
Arkansas	20,876,000	$1,019,000				3,542,000	1,738,000	8,341,000	$1,832,000	13.4
California	121,393,000	11,107,000				17,831,000	7,140,000	30,691,000	9,714,000	17.5
Colorado	1,203,000	120,000				6,000		156,000	52,000	32.1
Illinois	3,577,000	648,000								
Indiana	97,000	35,000						1,288,000	626,000	48.6
Kansas	15,811,000	1,210,000				7,398,000	8,698,000	24,276,000	5,895,000	14.6
Kentucky	861,000	80,000	3,187,000	$244,000	7.7		14,000	1,184,000	367,000	30.6
Louisiana	27,672,000	830,000	96,150,000	2,338,000	2.4	21,703,000	6,138,000	14,576,000	4,690,000	11.1
Missouri								1,225,000	424,000	34.6
Montana	1,203,000	37,000	2,049,000	41,000	2.0	214,000	214,000		77,000	18.0
New Mexico	998,000	44,000								
New York	464,500	14,000				2,000	19,000	653,000	413,000	61.3
Ohio	3,679,000	618,000				6,000	5,519,000	19,745,000	11,602,000	45.9
Oklahoma	204,006,000	13,424,000				23,630,000	7,967,000	28,584,000	9,547,000	15.9
Pennsylvania	7,990,000	2,003,000				1,727,000	106,000	60,365,000	21,081,000	33.9
Texas	103,498,000	4,564,000	35,495,000	1,117,000	3.1	32,004,000	24,905,000	53,525,000	20,441,000	18.5
West Virginia	15,864,000	2,337,000	1,921,000	174,000	9.1	812,000	159,000	24,038,000	6,898,000	27.6
Wyoming	20,224,000	819,000	4,394,000	132,000	3.0	14,520,000	302,000	481,000	1,059,000	6.9
Other[1]	38,500	3,000	891,000	18,000	2.0			224,000	91,000	40.6
	549,455,000	38,912,000	144,087,000	4,064,000	2.8	123,395,000	62,919,000	269,352,000	94,809,000	20.8
1928										
Arkansas	13,728,000	$1,086,000				3,737,000	1,573,000	11,940,000	$2,280,000	13.2
California	149,307,000	13,273,000				17,403,000	12,849,000	28,954,000	10,435,000	17.6
Colorado	1,180,000	118,000				4,000		4,534,000	1,032,000	22.7
Illinois	2,931,000	295,000						68,000	19,000	27.9
Indiana	85,000	9,000						1,383,000	702,000	50.8
Kansas	14,782,000	1,380,000				7,171,000	8,838,000	29,872,000	7,755,000	16.9
Kentucky	968,000	112,000	218,000	$22,000	10.1		16,000	3,847,000	1,460,000	37.8
Louisiana	26,004,000	1,211,000	104,670,000	2,473,000	2.4	22,034,000	10,138,000	19,782,000	6,675,000	12.8
Michigan	99,000	9,000						310,000	50,000	16.1
Missouri	8,000	1,000						3,629,000	827,000	22.8
Montana	1,116,000	106,000	1,760,000	35,000	2.0	351,000	612,000	1,080,000	373,000	18.3
New Mexico	772,000	39,000				27,000		8,000	5,000	14.3
New York	716,000	238,000					20,000	791,000	508,000	62.6
Ohio	3,850,000	1,406,000					4,206,000	25,917,000	13,349,000	44.3
Oklahoma	205,159,000	19,474,000				16,184,000	8,709,000	32,096,000	7,560,000	13.3
Pennsylvania	6,606,000	2,220,000				1,173,000	73,000	55,327,000	19,750,000	34.9
Texas	106,034,000	12,749,000	62,749,000	1,576,000	2.5	29,641,000	29,886,000	63,124,000	21,640,000	17.6
Utah			1,105,000	22,000	2.0					
West Virginia	17,876,000	3,767,000	494,000	69,000	14.0	1,519,000	187,000	21,789,000	6,401,000	27.2
Wyoming	22,473,000	853,000	4,141,000	124,000	3.0	15,706,000	219,000	1,281,000	1,242,000	7.2
Other[2]	4,000	1,000						259,000	83,000	32.0
	573,698,000	58,356,000	175,137,000	4,321,000	2.5	114,950,000	77,326,000	305,991,000	102,146,000	20.5

[1] Alaska, Maryland, and Utah.

[2] Alaska, Maryland, Mississippi, and North Dakota.

to $58,356,000, an average of 10.2 cents per thousand cubic feet, in 1928, as compared with $38,912,000, an average of 7.1 cents, in 1927. This apparent increase was largely due to a change in the metehod of reporting the value

The consumption of natural gas in the manufacture of carbon black constituted the second largest item among the industrial uses listed. The total quantity used in the manufacture of carbon black in 1928 amounted to 175,137,000,000 cubic feet, an increase over 1927 of 31,050,000,000 cubic feet, or 22 per cent. Although 60 per cent of the total used for carbon black was burned in the Monroe district of Louisiana, the Panhandle area of Texas made a material gain in 1928 and bids fair to take first place from the Monroe district in the near future. The total value of the natural gas burned for carbon black in 1928 amounted to $4,321,000, an average of 2.5 cents per thousand cubic feet, as compared with 2.8 cents in 1927. The average price in Louisiana was virtually unchanged; the average price in Texas decreased from 3.1 cents in 1927 to 2.5 in 1928, and this decrease was largely responsible for the decline in the average for the country as a whole.

The use of natural gas as a fuel at refineries, which has been increasing quite rapidly, declined in 1928; the total used in that year amounted to 114,950,000,000 cubic feet, as compared with 123,395,000,000 cubic feet in 1927. The largest factor in the total decline was the displacement of about 7,500,000,000 cubic feet of gas in Oklahoma by slightly over 1,000,000 barrels of fuel oil. Fuel-oil prices were low in 1928, and some refiners considered it economical to use their surplus oil in place of gas rather than sell the oil on a weak market.

The United States Geological Survey reports the consumption of natural gas for fuel in the generation of electric power by public-utility plants in 1928 as 77,326,408,000 cubic feet, an increase over 1927 of 14,407,211,000 cubic feet, or 23 per cent. Texas led in 1928 in the use of natural gas for generating electricity, California was second, and Louisiana was third.

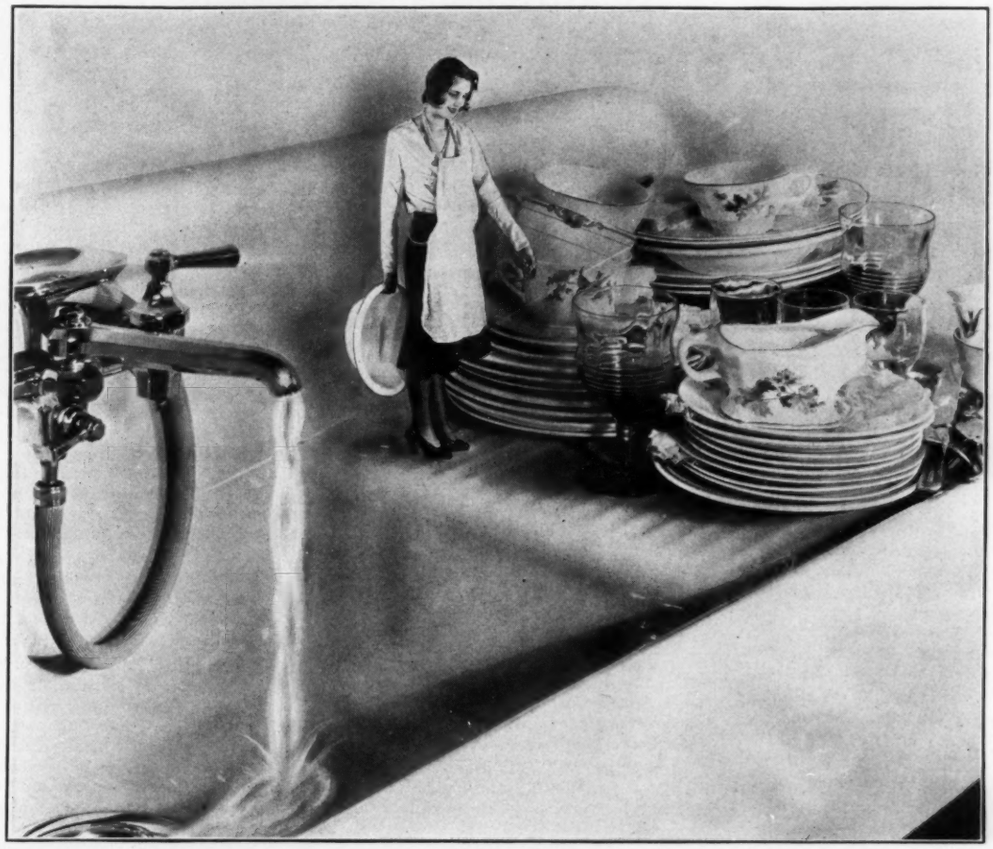
Interstate Transportation

The interstate movement of natural gas increased materially in 1928 when a total of 241,386,000,000 cubic feet was transported from State to State and to Canada and Mexico, as compared with 194,401,000,000 cubic feet in 1927. (See Fig. 3.) The movement of natural gas from West Virginia to Ohio continued to rank first in importance, although some recently established interstate deliveries—from Louisiana to Texas, for example—showed a larger increase in 1928. The total moved from West Virginia to Ohio in 1928 was 66,319,000,000 cubic feet, 41 per cent of the total production in West Virginia and the equivalent of 118 per cent of the output in Ohio.

The completion of several long trunk pipe lines crossing several States—the line from the Panhandle district to Denver, for example—resulted in a number of new interstate movements of natural gas, as follows: 16,000,000 cubic feet from Colorado to New Mexico; 160,000,000 cubic feet from Montana to South Dakota; 3,717,000,000 cubic feet from Texas to Colorado; and 6,789,000,000 cubic feet from Texas to Oklahoma.

Natural-Gas Wells

During 1928, 2,727 gas wells were completed in the United States, exclusive of California (for which State the record is lacking), as compared with 2,491 in 1927, an increase of 236 or 9 per cent. It is worthy for the country as a whole. The other two of note that this increase is very close to the increase of 8 per cent in production.



RUUD Plan Answers Question–
???? SUMMER SLUMP ????

When the heat is bouncing from the sidewalks and your salesmen are looking for shady spots, what can be done to keep water heater sales in high gear? The answer is the RUUD Summer Sales Plan, made to order for gas company use, complete in every detail and READY NOW!

This new sales-help is Part TWO of the famous 1930 TEN TO ONE program and the finest thing to stimulate summer selling you've ever seen. Write for it!

RUUD MANUFACTURING COMPANY
Pittsburgh, Pa.

TORONTO **HAMBURG** **LONDON**

Summer-time is water heater time. Competition of other fuels is at low ebb. The public needs MORE hot water in hot weather. Sell it to them.

Seven new refinements now feature RUUD-AUTOHOT, the world's leading storage water heater. All are described in a new broadside, now ready, which will be sent on request.

The following States led in 1928 in number of gas well completions: Texas, with 558; Ohio, with 515; Oklahoma, with 491; and West Virginia, with 404. The completions in these States comprised 72 per cent of the total for the country. Some of the States with comparatively small production had a disproportionately large number of completions. The output of these States, however, did not show material increase because the wells, almost without exception, were small and because the supply of gas from oil-well completions was small in comparison with the supply from completions in States such as Texas and Oklahoma.

Important counties or districts with respect to number of gas-well completions in 1928 were as follows: The Mirando district of Texas, with 119 completions; Grady County, Oklahoma, with 99; Athens County, Ohio, 86; Boone County, W. Va. with 74.

"KERAMIC KILNS"IS PUBLISHED BY DENVER FIRE CLAY CO.

Denver Fire Clay Company of Denver, Colorado, has recently published Bulletin No. 360, featuring "Keramic Kilns" for pottery and china firing and development work. The booklet is profusely illustrated and contains a treatise on elementary ceramic procedure by Hewitt Wilson, head of the Department of Ceramic Engineering of the University of Washington.

PHILLIPS PETROLEUM CO. HAS TWO NEW SUBSIDIARIES

Frank Phillips, president of the Phillips Petroleum Company, has announced the formation by his company, of two subsidiaries, the Phillips Natural Gas Company and the Phillips Petroleum Utilities Company.

NEXT MONTH...
IN THIS PUBLICATION
...A NEW AND WIDER SERVICE TO ALL USERS OF GAS FUEL WILL BE ANNOUNCED...

NATURAL GAS EQUIPMENT, INC.
Petroleum Securities Bldg. . Los Angeles
1123 Harrison Street . . San Francisco

MAKERS OF
Wilgus Pressure Regulators .... N. G. E. Gas Burners... Anubis Differential Pressure Recorders

Canneries Prefer Natural Gas

(Continued from Page 35)

The Hollister Canning Company plant has three horizontal return tubular boilers, one 150 h.p., one 125 h.p. and one 80 h.p. These boilers are equipped with NGE gas burners, using two type A in the lower door of each of the larger boilers and two type M in the lower door of the 80 h.p. boiler.

In this plant all of the boilers do not operate under the same steam pressure, but the Wilgus gas fuel regulator controlling the headers to all three boilers is adjusted so that the proper pressure for any boiler or combination of boilers can be obtained easily with a few turns of the adjusting nut.

One 500 B Metric meter was used to supply gas to the plant, the gas being measured at a 20-pound pressure per square inch, reduced from 50 pounds by a Reliance high pressure reducing valve. The pressure is reduced again from the meter to 5 pounds on the fuel line by a Wilgus gas pressure reducing valve.

This arrangement permits accurate measurement with a smaller investment in metering equipment than the single regulator would permit.

The boilers in this plant were changed over during operation, by continuing to burn oil in the larger boiler while the two smaller were being equipped for gas. The arrangement of the header is such that a separation between the boilers could be effected.

A still different situation was encountered in the San Martin Canning Company plant, for while they have four boilers, in making the conversion it was desired to equip only one boiler with gas, with the idea that the more flexible gas equipment would enable them to handle the variations of the load throughout the season without the additional expense of other equipment. This also reduces the maintenance on the other boilers.

The boiler equipped for use with straight natural gas was a 150 h.p. horizontal return tubular type, and the burners installed were two NGE type M in the lower or ash pit doors, with the supply line running along the floor.

Steam pressure is controlled by a Wilgus gas fuel regulator installed in a by-pass along the fuel line shut-off valve. The meters used were two 80 B Metric, measuring gas at 3 pounds, reduced from 50 pounds by a Reliance high pressure regulator.

Merco Nordstrom lubricated plug valves are used throughout with the exception of the control valves on the burner, where gate valves were used to allow a more convenient adjustment.

The fruit and vegetable canning loads are particularly favorable loads for the gas companies in California, because of the fact that their consumption falls during the summer months when the heating load and domestic consumption are low, and are shut down during the winter months when the demand for gas heating purposes and domestic consumption is high.

In this way an ideal balance is formed in the sendout. In the small towns of the Southern Division of the Coast Counties Gas and Electric Company, the presence of the canning industry enables the load factor to be balanced to a very satisfactory degree.

In converting such industrial installations as those described, the first step was to determine the operating characteristics of the equipment to be converted. The actual heating demands were given greater weight than the rated capacity of the equipment in question, and attention was given to the size, shape and condition of the combustion chambers. Care was taken that in the completed installation even distribution of heat would be affected without dead pockets or unswept surfaces. Too great volume of combustion space was avoided because of the greater distance through which the heat must be radiated, and because of the greater area for loss of heat through radiation from the outside walls.

Too small fire boxes were avoided because of the limiting effect of their size upon the heating capacity of the boiler. The highly heated products of combustion from the burner is directed in such a way as to avoid direct impingement on the boiler surface. Such impingement causes unnecessary deterioration of the surface and may cause a deposit of soot or lamp black.

After proper selection of the equipment and during conversion from other gas, attention was given to safety in the construction of the fuel lines, location of pilot valves and fittings. Convenience for the operator was considered from his own angle.

No attempt was made to lay out the details of the piping before the installation. The general plan only was sketched and the details of construction taken care of according to the wishes of the consumer, as it was often difficult for one not familar with the appearance and operation of new equipment to visualize the problems. After the completion of the conversion, care was taken in putting the boilers into service in order to avoid any possibility of danger.

The operating manager of the plant was carefully instructed in methods of handling gas burning equipment and lines were repurged up to the point where they entered the boiler room. The pilot line was first purged of air by maintaining a lighted torch in front of it until the gas burned in the proper manner. After all the pilots had been properly adjusted, one main burner at a time was opened up and the header purged.

After making minor adjustments in the location of the pilots and burner, it is often found desirable to correct for individual peculiarities of the particular boiler or fire box construction. It is a well known and ac cepted fact among boiler operators that no matter how similar boilers may seem, they very seldom will be found to have identical operating characteristics. For this reason, it is particularly desirable that a competent person should be in charge when the equipment is put into operation.

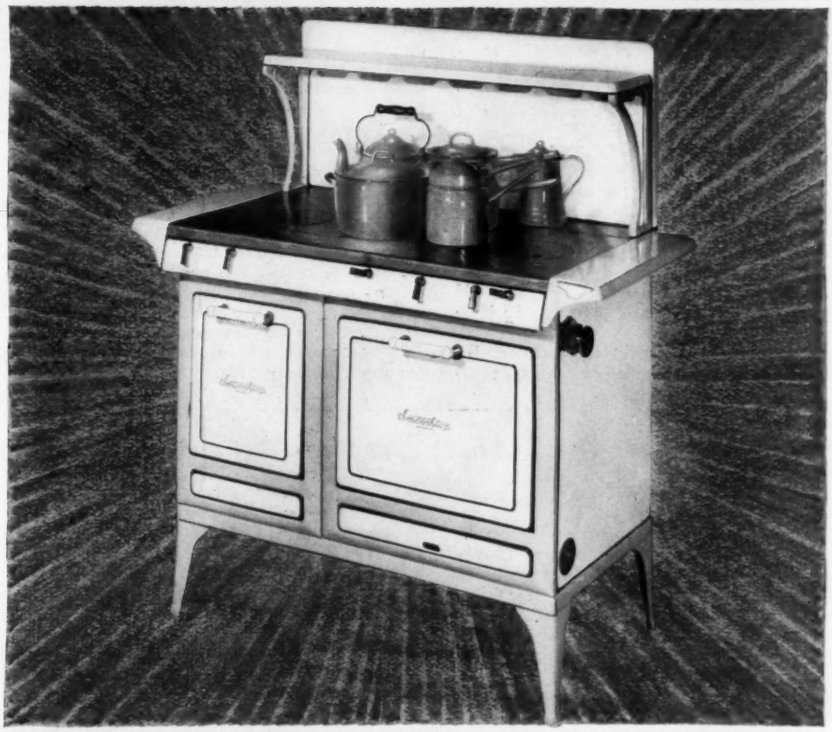
After the steam has been raised to the desired point, the automatic regulators are set to give the desired gas pressure and steam regulation.

Following a few days operation, observation indicated the range of load over which the boiler could be called upon to operate. The gas pressure on the fuel line was reduced to the lowest point at which it would give the necessary capacity to the equipment. Excessive pressure was avoided because of the greater variation in load which would be caused by the operation of the steam regulator.

In some cases it is desirable to control the steam pressure within very narrow limits, but ordinarily it is preferable to let the steam pressure vary over a 5-pound range,

THREE NEW MODELS

with Insulated Oven



Smoothtop

GAS RANGE

CAPTURES THE FLAVOR . . . FREES THE COOK

. . . A complete *insulated* line

IN June and July . . . a national magazine advertising campaign with a 3,000,000-circulation punch tells housewives in your territory about Smoothtop's wonderful insulated oven.

Display these marvelous new Smoothtop Gas Ranges on your floor. Tie up with this national interest in insulated ovens by presenting Smoothtops. Let the housewives in your territory see Smoothtop in demonstration . . . see how Smoothtop's insulated oven keeps their kitchen as cool as outdoors . . . see how Smoothtop's 4-heat-zone top cooking adds hours to their leisure.

Get Smoothtop's merchandising portfolio. You will agree it is the most complete and effective plan ever put behind a line of gas ranges.

STANDARD GAS EQUIPMENT CORPORATION • 18 EAST 41st STREET • NEW YORK, N. Y.
Pacific Coast Distributor: Northwest Gas & Electric Equipment Co., Portland, San Francisco, Los Angeles

thereby avoiding undue fluctuations or peaks in the gas demands.

After the operating range of the equipment has been regulated by the steam and gas pressure regulator, combustion tests by means of flue gas analysis and stack temperature were conducted by a competent engineer.

By this means the proper damper setting was determined for efficient operation.

The conditions of the boiler fittings was checked at this time to determine if any infusion of cold air was occuring around the joints of the fitting, or through cracks in the brick work. Considerable improvement in efficiency can almost always be effected by a few minutes investigation with a lighted candle or torch around the walls of the combustion chamber.

Leaks are indicated by a tendency of the flame to draw into cracks and seams and this can be remedied by inserting asbestos rope into the cracks, tamping well with a screw driver. This is preferable to the use of fire clay or shredded asbestos, as these wet plastics are inclined to dry and shrink, leaving the crack in almost as bad condition as before. A special boiler coating can be obtained on the market, which remains plastic perpetually and effectively seals all small cracks and fissures, if it is considered more desirable to use this.

If these leaks in the fittings are not investigated, stack analyses may lead to erroneous conclusions. For this reason it is often desirable to take samples not only in the stack but also in the last pass of the boiler, in the case of a water tube boiler, or in the rear end of the fire box in the case of a horizontal return tubular boiler. Comparing these analyses with the stack analyses will indicate the location in which the air is being drawn. Without this investigation, an attempt to produce high reading in the stack may result in incomplete combustion in the fire box, with secondary combustion in the boiler tubes or stack breeching.

After the installation is adjusted and tuned up to the most efficient operating point, it is left in the hands of the plant engineer, with instructions as to the proper operation of each unit of the equipment.

It is also necessary to make periodical checks at regular intervals to insure the highest possible efficiency being maintained at all times.

By this method of installation and follow up, straight natural gas has met with instant favor with the canning industry throughout the properties served by the Coast Counties Gas and Electric Company, all of them having completed the changeover to this new fuel since the first of the year. This industry has also been a material aid in the bringing back of the gas load to the volume and almost to the revenue level existing before the advent of natural gas, in a period of approximately four months.

LINE TO TUCUMCARI, N. M., GETS UNDER WAY IN JUNE

The Gas Company of New Mexico, a subsidiary of the Southern Union Gas Company, recently completed the construction of an 8-inch line from Farwell, Texas, to Clovis, New Mexico. This line has later been extended to Portales, a distance of 15 miles. The line feeds at Farwell from the pipe line of the South Plains Pipe Line Company extending from Amarillo. The company has just begun the construction of a line extending in a northwesterly direction from Clovis to serve Tucumcari. This line will be approximately 60 miles in length.

JOS. GREENSPOON'S SONS IRON & STEEL CO. OPENS DALLAS OFFICE

C. C. Hurlburt, formerly associated with the Jos. Greenspoon's Sons Iron & Steel Company offices at Tulsa, Oklahoma, has opened offices for the company in Dallas, Texas. Mr. Hurlburt, who will be in charge of the office, will maintain headquarters at the Baker Hotel, Dallas, until permanent quarters are established. His territory will include all of Texas and Louisiana and southern Arkansas.

PROGRESS ON $750,000 HOLDER CONSTRUCTION PROGRAM

With foundations laid on 21 holders at different points throughout southern California, Southern Counties Gas Company has its $750,000 program of addition to high pressure storage facilities well under way. Four of the tanks are up at Santa Monica and two at Santa Ana; plates are now being put on the hemispherical ends of the holders at these locations. Locations of the holders are: San Pedro (2), Santa Ana (4), Pomona (2), Ontario (2), Santa Monica (11). A total of 12,963,000 cubic feet will be added to the company's gas storage system by these additions.

OZARK PIPE LINE COMPANY BEGINS CONSTRUCTION ON 63-MILE LINE

The Ozark Pipe Line Company, subsidiary of the Oklahoma Natural Gas Corporation, has begun the construction of the 16-inch line of the company extending from the Quinton field to Muskogee and Bald Hill, in Okmulgee County, a distance of 63 miles. The Mid-Western Oil & Gas Company will supply the gas in the Quinton field.

For Reliability—*Specify*

Ingersoll-Rand

GAS INDUSTRY

Pneumatic Equipment

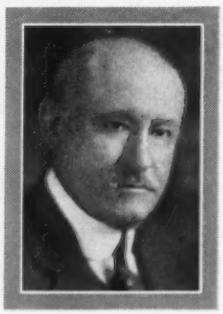
INGERSOLL-RAND COMPANY

NEW YORK CITY · LOS ANGELES · SAN FRANCISCO
SEATTLE · EL PASO · DALLAS · DENVER · MEXICO CITY
TULSA · ST. LOUIS · PITTSBURGH · BIRMINGHAM · BUTTE
SALT LAKE CITY · NEW ORLEANS

Offices in principal cities the world over

FRANK CHASE DISABLED IN UNUSUAL ACCIDENT

LATE word from the offices of Frank L. Chase, second vice-president and manager of operations of the Lone Star Gas Company, Dallas, Texas, is that he is recovering as rapidly as possible from the accident which occurred at Council Bluffs, Iowa, while he was on a business trip to that city.



Frank L. Chase

Mr. Chase is now confined to the Angelical Covenant Hospital at Omaha, to which he was taken immediately following the accident, which broke his right leg about six inches below the hip. Mr. Chase tripped on an in the dining room of the hotel at Council Bluffs. Doctors have stated that the fracture is a simple one and that the reduction is satisfactory. It is expected that he may be confined to the hospital for a period of several weeks.

WESTERN SERVICE CORPORATION IS NEW IN UTILITY FIELD

Earl R. Ernsberger, a former president of the Southwestern Light and Power Company, has announced the forming of The Western Service Corporation, a holding company to operate gas and electric utilities, radio and oil wholesaling. Mr. Ernsberger has been made president of the corporation which is capitalized at $5,000,000. The company was organized under the laws of Delaware. Mr. Ernsberger resigned from his official position with Southwestern Light and Power Company, headquarters of which are in Oklahoma City, on January 1, 1929.

W. W. HILL GOES TO ARKNATCO HEADQUARTERS FOR RESEARCH

W. W. Hill, industrial engineer, with the Little Rock Gas & Fuel Company, has been transferred to Shreveport, headquarters of the Arkansas Natural Gas Corporation, of which the Little Rock Company is a subsidiary, to do special research work in engineering. Mr. Hill has been associated with the Doherty interests since 1913.

C. L. FERGUSON NOW HAS VALLEY TERRITORY FOR WELSBACH

C. L. Ferguson, who formerly travelled the Valley territory of northern California for the H. R. Basford Co., has recently become associated with the Welsbach Co. He will cover the same portion of the State under the direction of Frank C. Packer, district manager.

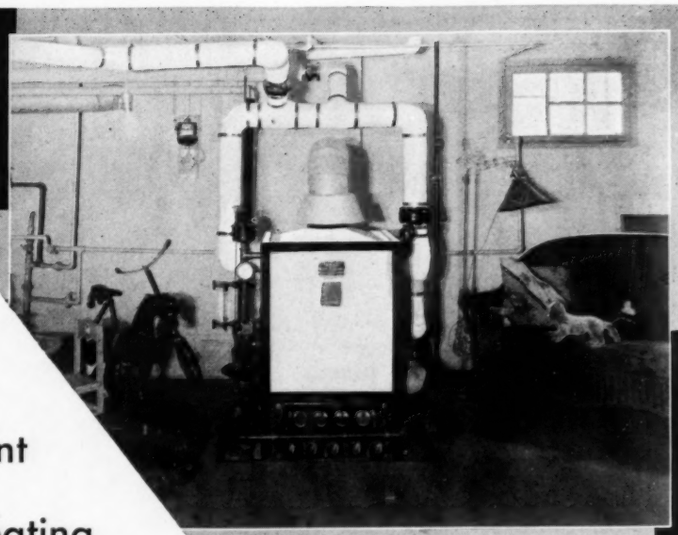
CLARE N. STANNARD HONORED BY DENVER C. OF C.

Clare N. Stannard, vice-president and general manager of the Public Service Company of Colorado, has been elected first vice-president of the Chamber of Commerce of Denver, Colorado.

CITIES SERVICE COMPANY OPENS LOS ANGELES OFFICE

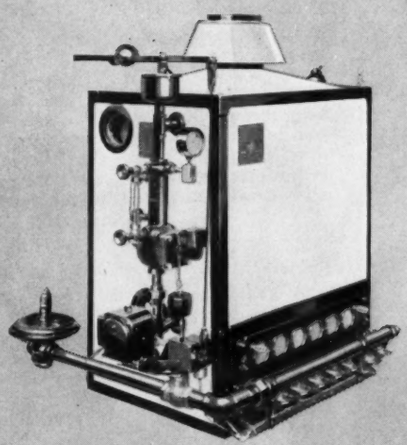
Cities Service Company of New York has opened offices in Los Angeles, California, and plans to spend $25,000,000 in the development of its holdings in the state during the next five years.

Why they are selling fast



. . . . . everyone wants a modern basement . . . and automatic heating that is really automatic . . . owners everywhere are quick to see the advantages of Ideal Gas Boilers — the product of the largest manufacturer of heating equipment in the world . . . that is why they are selling so fast . . . are you getting your share of this profitable business? . . .

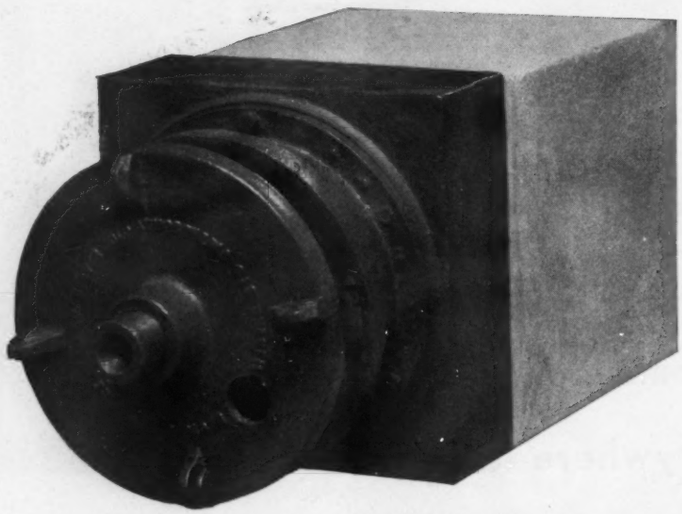
IDEAL GAS BOILERS

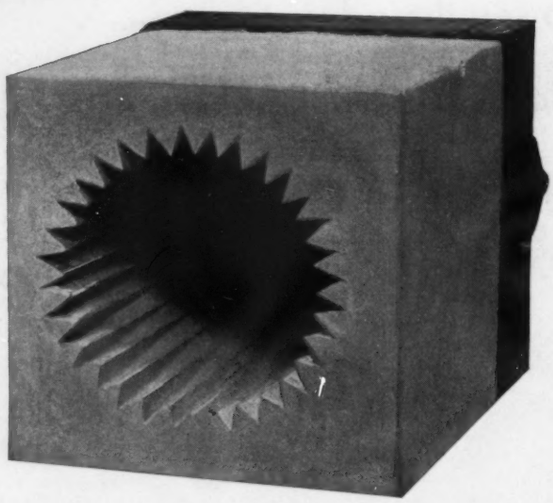


Manufactured by
AMERICAN RADIATOR COMPANY

Distributed by
AMERICAN GAS PRODUCTS CORPORATION
CHRYSLER BUILDING, NEW YORK

Refractory where it meets the Heat





Write today for Bulletin 305

The *first* duty of the DFC Atmospheric Gas Burner is to create heat. It performs that duty with an efficiency which repeatedly is paying for the installation out of fuel savings within two to six months. The user gets positive, simplified flame control. He gets *a flame that won't blow out,* whether the gas pressure is 8 ounces or 35 or more pounds per square inch. The DFC burner presents a *refractory throat and nozzle* to high temperatures which would disintegrate ordinary equipment not protected by water cooling or other complicated systems. DFC burners are withstanding hundreds of hours at temperatures from 2,500° to 3,200° without sign of disintegration. Made in a wide range of sizes and capacities. Write for facts today.

The Denver Fire Clay Company

Denver, Colo., U. S. A.

Branches at Salt Lake City, El Paso and New York

Minute-Movies Attract Tomorrow's Gas Users

(Continued from Page 33)

lady making a trip to an old garbage can. (It turned out that the hand drawn sections taught us some new points for pictured plots.)

The moving picture of this scenario include a shot of a garbage wagon being loaded, and a play scene in a beautiful backyard with the caption, "Keep your backyard as attractive as the front." Six children are playing in this scene. (We always use our friends somewhere in the movie, and have elementary or high school students wherever possible).

When our movie opens at one of the prominent neighborhood houses, we run a little teaser advertisement in the Monday papers. For instance, for this new film, it showed as follows, one column one inch space, in newspaper type:

DALLAS ACTORS IN MOVIE

Six young Dallas players appear on the screen this week at the Arcadia Theatre. The scene is a gay one, laid in a beautiful back yard in Oram Street, and the plot includes a Gas Incinerator in the basement. (Advt)

Out of the 38,000 students in the elementary and high schools of Dallas, we believe that several thousands of them see our screen advertising, and take it in with amiable interest. But of course they do no buying—this advertising is missionary work almost entirely.

They may read our messages whole-heartedly (as precious few of our citizens do, Heaven help us!) but they are not a market at present. This is one of the things that keep an advertiser's life from being one long sweet song. People who *can* buy, are heartless ignorers and forgetters of advertising. Take these very high school youngsters; the minute they grow into household purchasers they lose that jolly responsiveness which we see them giving to these little movies today. It seems to be a strange and malicious adjustment, to pester the advertising departments of this world.

But we can count on having some of this advertising stick in their minds to do us some good by-and-by. If you have an interesting, friendly reel on the screen, they help themselves to your phrases, they take you into their ever-flowing patter, and the next thing you know, you are part of the talk of the town. And town talk is the best advertising that any gas company can get.

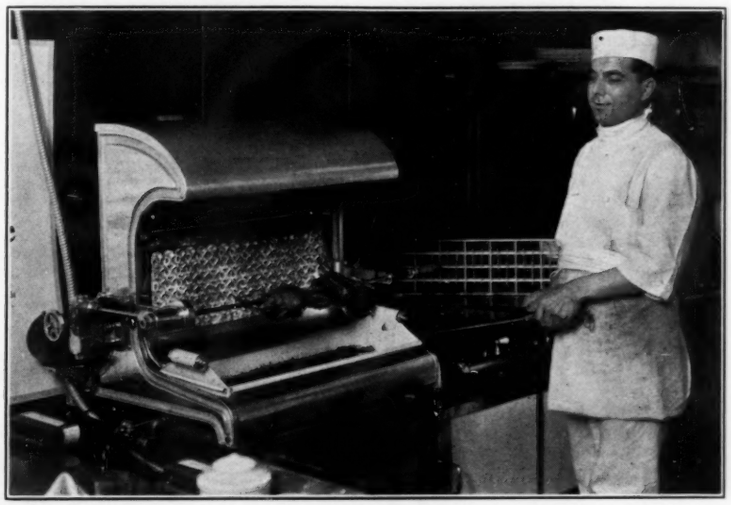
ARKANSAS POWER & LIGHT CO. GETS FRANCHISE AT NEWARK

A gas franchise was recently granted to the Arkansas Power & Light Company at Newark, Arkansas, the laying of gas mains to begin within 60 days from June 1. Representatives of the company state that the crew now piping Batesville will be moved to Newark at the completion of the Batesville job.

GEO. D. ROPER CORP. MOVES DALLAS, TEXAS, OFFICES

Announcement has been made of the removal of the Geo. D. Roper Corporation offices in Dallas, Texas, to new quarters on the same floor in the Santa Fe Building. J. C. Mansfield has charge of the gas range division of the southwestern office and L. B. Hyde the pump division.

A Prime Favorite for Summer Sales



Many gas salesmen have swelled their Summer sales commissions by going off the beaten track with the Humphrey Rotisserie. The open type model is ideal for catering concessions at public parks, highway barbecue and even hot dog stands. Steaks, chickens and chops thus prepared have a mouth-watering appeal that stops the passing throngs.

The oven type rotisserie is finding an increasingly popular market in the larger homes where mechanical household equipment is already accepted as a modern necessity.

Here are two classes of prospects that have not been worked to death—a real opportunity for real salesmen.

Both the open and closed type models of the Humphrey Rotisserie are provided with a continuous revolving spit for chickens and squabs, and with an intermittent broiler, timed to turn once every half minute, for steaks and chops.

The HUMPHREY Rotisserie

Pacific Coast Manager
C. B. Babcock
135 Bluxome St.,
San Francisco

Manufactured by
General Gas Light Co.,
Kalamazoo,
Michigan

The Inertol Company

announces the establishment of a

Pacific Coast Branch

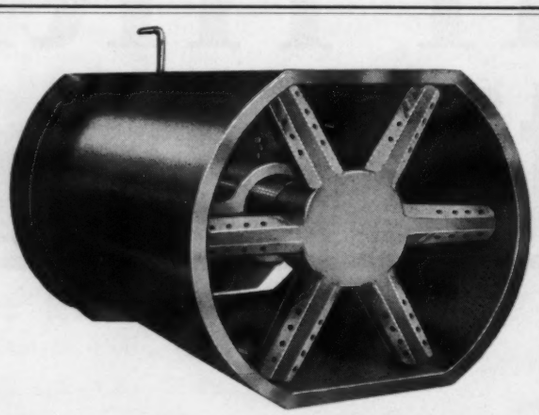
at 447 Sutter Street,
San Francisco

under the management of

Mr. B. W. Mueller

Warehouse stocks of both Inertol and Imunol are carried in all principal cities throughout the West.

GAS
BURNERS
For
ALL INDUSTRIAL PURPOSES
JOHN ZINK CO.
Oklahoma Natural Gas Bldg.
Phone 4-9838
TULSA, OKLAHOMA
★
Flameless Burners
Flame Burners
Short Flame Burners



Two Courses Announced *in* Home Service

A HOME Service Course in Domestic Gas Appliances was held at the Testing Laboratory of the American Gas Association at Cleveland, Ohio, June 16-21, 1930. A similar course of lectures, demonstration and practice was also given last summer.

The laboratory course was basically technical, and was designed to give gas company home service department members a more thorough knowledge of gas appliances. In order to increase the value of the course, service conditions for both manufactured and natural gas, available at the A.G.A. Laboratory, were included in the work. Points covered in the course were as follows:

Service Conditions—Lectures and demonstrations covering the effects of various gas service conditions.

Appliances—Lectures and demonstrations of the operation of ranges, insulated and non-insulated; water heaters, tank, instantaneous, and storage types of construction and controls; various types of room heaters, their operation and selection for proper usage; short discussion of house heating, mainly concerned with controls; discussion and explanation of miscellaneous appliances such as refrigerators, incinerators and laundry dryers.

Ventilation and Chimney Conditions—The effect on operation of appliances and atmosphere of living quarters.

A three weeks course for home service workers is also to be given for the fourth consecutive summer term, at Columbia University, from July 7-25, 1930. This study includes lectures on food nutrition, model lecture demonstrations, and work on household management. Lecture and laboratory work on household engineering, study of physics as applied to the operation and use of gas appliances, laboratory tests in insulated and non-insulated ranges, and adjustment and control of all appliances will be included in the work. Field trips will be made to home service departments of gas companies, and magazine institutes.

REPUBLIC ELEC. POWER CO. BUYS OKLAHOMA GAS PROPERTIES

Wilbur J. Holleman, of Oklahoma City, vice-president of the Apache Gas Company and the Gas Transport Company, has announced that properties of the companies have been sold to the Republic Electric Power Company of Los Angeles, California. The common stock of the Apache Gas Company to the amount of $500,000 was purchased by the California company according to the announcement.

The Apache Gas Company and Gas Transport Company operate gas distribution and transmission properties serving Apache, Lovell, Marshall, Perry and Roxana. S. N. Williams, Jr. and David R. Williams of Tulsa, were also officials of the companies.

Operations of the Republic Electric Power Company have been confined to electric and water properties in California, but it is reported that the company expects to acquire additional properties in Oklahoma, Kansas and Texas.

PETROLENE, LTD., WILL SELL NEW LIQUEFIED GAS

J. A. Campbell Company of Long Beach, California, has placed a new liquefied natural gas on the market which will be sold under the name of petrolene. Petrolene, Ltd., is the name of the new corporation organized to handle this product.

This FREE TRIAL OFFER *stepped up sendout* 1080 MCF *yearly!*

In first two months of operation, Indiana public service company sells an Electrolux a day in a small industrial community

LOCAL NEWSPAPERS *carried the story of the Electrolux 60-day trial offer right into the homes.*

ORDINARILY, you don't expect to sell many automatic refrigerators in a small industrial community. Most of the workers rent their homes . . . are not even sure of regular employment.

Yet 60 Electrolux refrigerators were sold in two months in a district like this centering around Hammond, Ind. To put it over, the Northern Indiana Public Service Company made use of this free trial offer.

They offered every customer a 60-day trial of Electrolux. The only guarantee required was a $10 down payment. And even this was to be returned at the end of the trial period if the customer was not entirely satisfied.

Four newspaper advertisements, like the one shown above, were inserted during the month in the local papers. These carried the announcement of the offer. Customers began signing up immediately. And sales proved so gratifying that the next month a 30-day trial period was offered.

In two short months, 1080 MCF were added to the yearly domestic load. Because every Electrolux installed increases billing an average of 18,000 cubic feet a year. In addition, the gas company realized a profit on the sale of the refrigerators themselves.

Progressive gas companies have been quick to grasp the enormous load-building possibilities in the sale of Electrolux. Electrolux transforms small domestic accounts into permanent large accounts . . . builds up the off-hour load . . . creates new prestige for the gas industry. For further information about ways to merchandise the free trial offer—or other sales plans—write, wire or telephone Electrolux Refrigerator Sales, Inc., Evansville, Indiana.

ELECTROLUX

THE *Gas* REFRIGERATOR

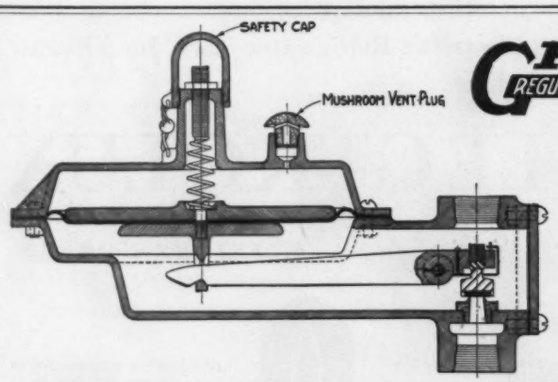
A tiny gas flame takes the *place of all moving parts*

The BARTLETT HAYWARD CO.

BALTIMORE *Engineers and Founders* NEW YORK

DESIGNERS AND BUILDERS
– OF –
COMPLETE COAL GAS PLANTS
CARBURETTED WATER GAS PLANTS
BY-PRODUCT PLANTS
DE BROUWER CHARGING AND
DISCHARGING MACHINES
SALT WATER AND FRESH WATER
CONDENSERS
PURIFIERS
SHAVING SCRUBBERS
CENTRIFUGAL VERTICAL TYPE
SCRUBBERS
STEEL TANKS
VERTICAL WASTE HEAT BOILERS

GAS HOLDERS



GROBLE REGULATORS & GOVERNORS

The Groble No. 1 Service Regulator with or without Dead Weight Safety Valve, made with ¾", 1" and 1¼" Inlet and Outlet Connections.

GROBLE GAS REGULATOR COMPANY, Anderson, Ind.

Southern Natural *in* Large Construction Program

SOUTHERN Natural Gas Corporation has recently awarded contracts for the construction of more than 500 miles of additional transmission system on which construction is now under way. It is expected to bring the projects to completion before the winter months.

For a 215-mile line that will extend from Yazoo city through Jackson and Hattiesburg to Mobile, the contract has been let to the Natural Gas Engineering Corporation, for the actual laying of the line. The contract for the clearing of this line has been awarded to C. S. Seale of Sicily Island, La., and Cox & Carpenter of Bastrop, La., will string the pipe.

Lateral lines feeding from this transmission line will supply Laurel, Gulfport, Biloxi and Pascagoula.

A 104-mile line extending from Tuscaloosa southeast and east to a point near Columbus, Ga., will be constructed by O'Brien Bros., of Chicago. Lateral lines from this unit will supply gas to Selma and Montgomery. Laterals will also be built to Tuskegee in Macon County, and Auburn and Opelika in Lee County.

Another unit in the company's construction program is a 185-mile line extending from a point near Atlanta, Ga., to Griffin, thence to Macon, and east into Wilkinson County. W. S. Bibb of Birmingham, who constructed the lateral to Meridian, Miss., for the company, has been awarded this contract. Under present plans, laterals from this line will extend to Thomaston, in Upson County, and Milledgeville in Baldwin County.

A compressor station will be constructed by the company at Pickins, Miss., calling for five 1,250 h.p. compressors. The contract for this station has been awarded to A. M. Lockett & Company, who will also install an additional 1,250 h.p. compressor at the Reform station, completed last year. Worthington compressors will be installed at both places.

Another compressor station will be constructed at D'Armandville, Ala. in which two 1,000 h.p. Cooper-Bessemer compressors will be installed.

United States Steel Corporation, the Republic Steel & Iron Company, and the A. O. Smith Engineering Corporation, are furnishing the pipe, involving an expenditure of approximately $4,000,000. The additional compressor units will cost approximately $1,210,000.

STOCK ISSUE OF $7,500,000 BY CENTRAL ARIZ. L. & P.

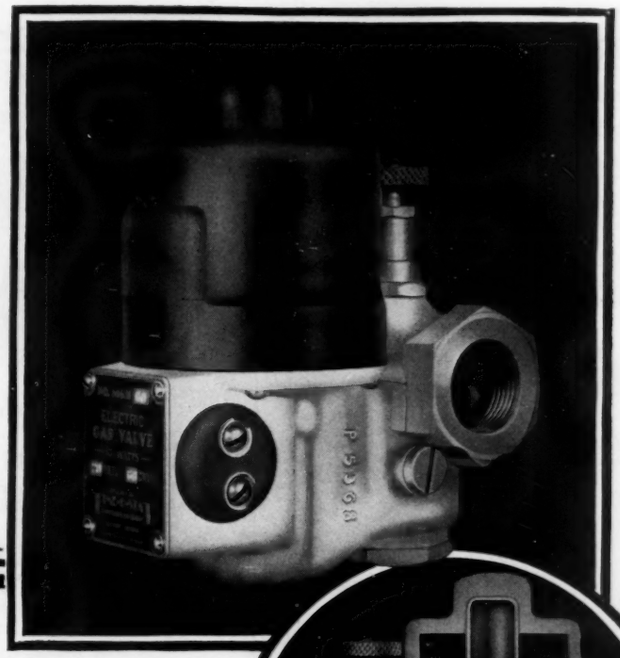
A new issue of $7,500,000 first mortgage five per cent bonds, due in 1960, were offered to the public late in June by the Central Arizona Light and Power Company of Phoenix, Ariz. The bonds are priced at 96¼ to yield approximately 5.25 per cent.

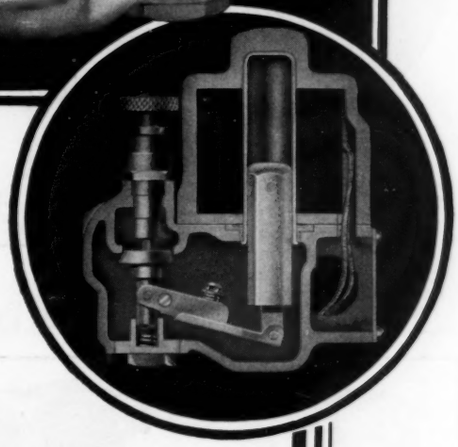
Central Arizona Light and Power Company is controlled through common stock ownership by American Power and Light Company. Net earnings for the Arizona Company for a 12-months period ended April 30, 1930, were reported at $1,298,917.

P. G. AND E. AUTHORIZED TO BUY MODESTO OUTSTANDING STOCK

Pacific Gas and Electric Company of San Francisco has been authorized by the California Railroad Commission to acquire the remaining 302 shares of capital stock of the Modesto Gas Company still outstanding, and to issue in payment 3572 shares of Pacific Gas and Electric Company's capital stock of a par value of $89,300.

New...
LEVER TYPE ELECTRIC
Gas Valve..





No. 606 Electric Gas Valve

The cutaway view shows lever type mechanism with its inverted seat that prevents dirt accumulation. Top and bottom guides of the plunger assure positive gas tight seating. A transformer is furnished with all low voltage models.

NEW in design—new in principle—an exclusive Time-O-Stat development . . . The No. 606 Series ¾" Electric Gas Valves are specially designed for use with space heaters, unit heaters and conversion burners. A manual control feature is furnished with low voltage models which eliminates the need of by-pass for operation during power failure. Special construction features of the No. 606 Series insure long and satisfactory service. Ruggedly built with non-corrosive materials — simple to install. Send coupon for complete information.

TIME-O-STAT CONTROLS COMPANY

ELKHART, INDIANA

Branch Offices:
Chicago, New York, Boston, Detroit, Kansas City.
Export Department: New York.
Exclusive Distributors in All Principal Cities of the United States.
Canadian Distributors: Toronto and Montreal.

Manufacturers of Automatic Controls *for all types of Burners — Electric Refrigerators — Furnace Fans — Industrial Ovens — Ice Machines — Unit Heaters . . . also of Sign Flashers — Mercury Switches — Electric Heaters — Corrugated Metal Bellows.*

TIME-O-STAT AUTOMATIC CONTROLS

TIME-O-STAT CONTROLS COMPANY Dept. 6G
Elkhart, Indiana

Without obligation on my part, please send me full details on the 606 Electric Gas Valve — and other Time-O-Stat Automatic Controls.

Name.....

Address.....

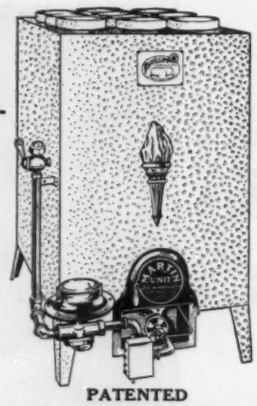
Company.....

THE BABY DIGGER

The Ideal Modern Way To Dig Gas Trench!

Cleveland Baby Diggers are unequalled for downright usability and trenching satisfaction. Compact — transportable — economical. Tough — fast — dependable. Precision built of finest materials. A wheel type trencher on full crawlers. You'll find Cleveland Trencher pioneering the features that count. Write for particulars.

THE CLEVELAND TRENCHER COMPANY
"Pioneers of the Small Trencher"
20100 St. Clair Ave.
Cleveland, Ohio, U. S. A.
Distributed By
Edward R. Bacon Co., San Francisco, Cal.
Frank T. Hickey Co., Los Angeles, Cal.



PATENTED

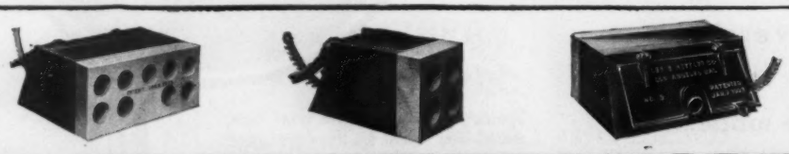
Martin Unit Gas Furnaces

ARE THE RESULT OF 38 YEARS HEATING EXPERIENCE
MADE IN FOUR SIZES
Electric, Thermostat or Manual Control
Approved by A. G. A. Laboratory and by the City of Los Angeles
Write for your copy of "Modern Heating Methods"

PHILLIPS HEATING, VENTILATING & MFG. CO.
1710 W. Washington St.
Los Angeles, California

Live Agents Wanted

TESTING LABORATORY A.G.A. APPROVED



Mettler Entrained Combustion Gas Burners

FOR ALL Purposes
Kinds of gas
Pressures

406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.

Gentlemen:
Kindly send me a sample can and full details regarding

A-B Vit

The New Porcelain Enamel Cleaner

Name.....

Company.....

Address.....

No obligation, of course
Clip and mail today to

A-B STOVE CO., Battle Creek, Mich.

UNITED GAS CORPORATION GIVES SET-UP FOR CONSOLIDATION

ON June 3 the United Gas Corporation, the new natural gas subsidiary of the Electric Power & Light Corporation, filed in Delaware an amendment to its certificate of incorporation through which its authorized capitalization is increased. The company also declared operative the plan dated March 29, 1930, under which it is acquiring securities of the United Gas Company, and certain of its subsidiaries, of Louisiana Gas & Fuel Co., and of the Palmer Corporation of Louisiana.

Approval of the plan brings about consolidation of the ownership and operation of the United Gas System and the natural gas properties of the Electric Power & Light Corporation, and brings into the group the natural gas system of the Magnolia Gas Company, formerly owned by the Standard Oil Company of New York.

Officers of the United Gas Corporation include S. Z. Mitchell, chairman of the board; C. E. Goesbeck and O. R. Seagraves, vice-chairmen; O. R. Seagraves, chairman of the executive committee; Ralph B. Feagin, president; H. C. Abell, S. R. Inch, O. H. Simonds, N. C. McGowen, E. W. Hill and L. H. Parkhurst, vice-presidents.

The board of directors is made up of H. C. Abell, Charles M. Clark, H. C. Couch, E. G. Diefenbach, Ralph B. Feagin, Charles V. Graham, C. E. Goesbeck, Charles Hayden, S. R. Inch, Hunter S. Marston, N. C. McGowen, S. Z. Mitchell, O. R. Seagraves, O. H. Simonds and E. B. Tracy.

The properties will be operated under the supervision of Electric Bond & Share Company.

This gives the United Gas Corporation control of approximately the following percentages of the outstanding common stocks of the following principal subsidiaries of United Gas Company: Houston Gulf Gas Company, 94 per cent; Dixie Gulf Gas Company, 97 per cent; Southern Gas Company, 99 per cent; Southern Gas Utilities, Inc., 99 per cent; South Texas Gas Company, 99 per cent, and Dixie Gas & Utilities Company, 81 per cent.

United Gas Corporation also owns 100 per cent of the common stock of Louisiana Gas & Fuel Company, and 100 per cent of the common stocks of the latter's subsidiaries, either directly or indirectly, including The Palmer Corporation of Louisiana, the Industrial Gas Company, Southern Gas & Fuel Company, Louisiana Gas Company, Panola Oil & Gas Company, Northern Louisiana Natural Gas Company, Ouachita Natural Gas Company and Excelsior Pipeline Company.

SO. COUNTIES GAS CO. OPENS NEW LAGUNA BEACH OFFICE

Southern Counties Gas Company, with headquarters in Los Angeles, has recently completed and opened a new office building in Laguna Beach. The building was constructed at a cost of $10,000 and was a direct response to the increasing business in that territory. Modern in architecture and interior furnishing, the new building is one of the most attractive in the city.

Gas appliance sales have shown a marked increase in this district, with gas ranges, furnaces and refrigerators leading the field.

COAST COUNTIES GETS PERMIT TO SELL WEST SIDE NATURAL

Coast Counties Gas and Electric Company, with headquarters at Santa Cruz, California, has been granted permission to sell its Avenal, California, gas property to West Side Natural Gas Company.

"Ready – so soon!"
INSTANT HOT WATER
does save 4 to 6 hours
each week.....
If you would exchange 4 to 6 hours each week for sunlit hours of freedom—
If you would have plenty of hot water at the turn of a faucet—
Then accept this automatic hot water service.
It is the same instant hot water service that men like in fine hotels—for bathing and shaving. It is brought to you by the Automatic Gas Water Heater. Because of its insulated tank and efficiency, the cost is less per gallon to heat water with an Automatic Gas Water Heater than with the old fashioned methods of waiting for water to heat.
And once you install the excellent service, there's never any delay or bother about having an abundant supply of hot water—day and night.
Plenty of hot water, at the turn of a faucet, does save time by quickly dissolving dirt and grease.
For full details about having an Automatic Gas Water Heater, telephone or call at one of for a dealer's store
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned·Operated·Managed
by Californians

actual size of this advertisement— 4 column, 15 inch

Advertising . . . . that doesn't cost the dealer a cent!

This Company continues to encourage the use of Automatic Gas Water Heaters.

The advertisement reproduced above is only one, of many, which is appearing now in hundreds of newspapers in P. G. and E. territory.

Notice how the dealers are brought into the picture.

The percentage of the consumer's dollar, used for the purchase of Automatic Water Heaters, is determined primarily by the number of companies advertising them. The more advertising of Automatic Water Heaters, the greater are the sales for everyone . . . and that includes you.

Thus, the advertising of the Pacific Gas and Electric Co. **is** helping to build up the market for all of those who sell Automatic Gas Water Heaters.

PACIFIC GAS AND ELECTRIC COMPANY

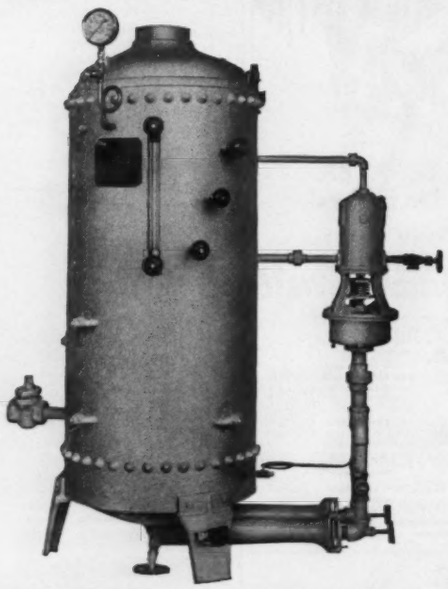
P·G·and E·

Owned·Operated·Managed

by Californians·

Automatic Gas Fired Boilers

LATTNER



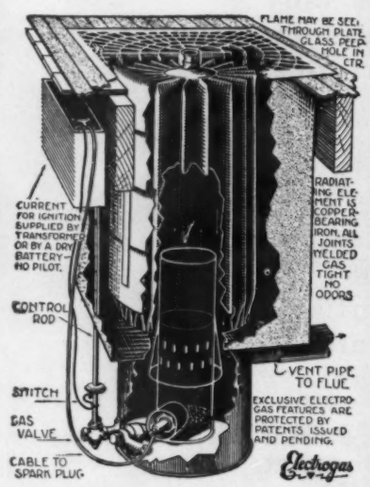
All Sizes from ½ to 30 H. P.

P. M. LATTNER MANUFACTURING CO.

Factory
516 12th Avenue
Cedar Rapids, Iowa

Warehouse Distributor
2646 South Hill Street
Los Angeles, California

Electrogas


FLAME MAY BE SEEN THROUGH PLATE GLASS PEEP HOLE IN CTR.
CURRENT FOR IGNITION SUPPLIED BY TRANSFORMER OR BY A DRY BATTERY—NO PILOT.
RADIATING ELEMENT IS COPPER-BEARING IRON. ALL JOINTS WELDED GAS TIGHT NO ODORS
CONTROL ROD
VENT PIPE TO FLUE
SWITCH
EXCLUSIVE ELECTRO-GAS FEATURES ARE PROTECTED BY PATENTS ISSUED AND PENDING.
GAS VALVE
CABLE TO SPARK PLUG
Electrogas

—The Officers' Quarters, San Francisco Presidio, are heated by these remarkable floor furnaces.

Manufactured in San Francisco by Electrogas Furnace Co., Rialto Bldg.

Electrogas

THE WILCOLATOR Oven Heat Control

THE WILCOSTAT Room Temperature Control

Made by the
WILCOLATOR COMPANY
NEWARK, N. J.

Southern Union Interested *in* Arizona Outlet

ANOTHER proposal to serve Arizona mining interests with natural gas is made public with a report that Southern Union Gas Company of Dallas, Texas, is considering the construction of a natural gas transmission line from the San Juan Basin fields in northwest New Mexico to certain smelters in Arizona, and on to Prescott and Phoenix and other Salt River Valley towns.

While no definite announcements have been made about the line it is reported that consideration is being given to the project by the Southern Union interests who have large holdings in the San Juan Basin fields which are said to be the nearest gas fields to the Arizona market.

The Southern Union Gas Company has been pursuing an aggressive expansion policy of late, with construction now being under way on a 320-mile line from the San Juan Basin fields to Albuquerque, Santa Fe and Las Vegas. The line, half of which is being constructed of 10- and 12-inch pipe and the remainder of 8-inch or smaller, is proceeding in a southeasterly direction from the fields to Bernalillo and on to Albuquerque and Santa Fe. A line extending north and east from this line will serve Las Vegas. Belen, 20 miles south of Albuquerque will be served with gas from an extension to be constructed from Albuquerque.

PROGRESS REPORTED ON MONTANA-DAKOTA TRANSMISSION LINES

Construction of the 90-mile natural gas transmission line from the Baker-Glendive structure in Montana, to Williston, North Dakota, was expected to be finished by July 1. Hope Engineering and Construction Comany is laying the line for Montana-Dakota Utilities Comany, a subsidiary of the Minnesota-Northern Power Company.

The same organization has completed several miles of a second line into North Dakota. This line will extend from the Baker Glendive source to Bismarck, serving many towns en route. The Bismarck carrier will be well over 175 miles long, and is scheduled to be completed by October 1.

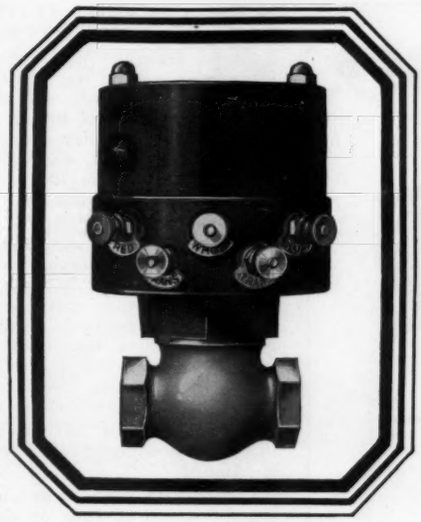
FLOYD J. TUCKER NOW HOUSE HEATING ENGINEER AT JOPLIN

Floyd J. Tucker on June 1 assumed the duties of industrial and house heating engineer at the Joplin Gas Company, Joplin, Mo., replacing C. B. Wilson, who has been transferred to an affiliated company at Shreveport, La.

Mr. Tucker has been associated with the Doherty interests since 1924 and had served the company in Kansas City, Wichita, Topeka and in Oklahoma. He was connected with the Kansas City office prior to accepting the position at Joplin. He is a graduate of the Kansas Agricultural College at Manhattan, class of 1923.

MISSOURI-KANSAS PIPE LINE CO. MOVES K. C. OFFICES

Missouri-Kansas Pipe Line Company has moved its operating division offices to larger quarters in the Fairfax Building, 101 West Eleventh street, Kansas City, Mo., according to announcement early in June by its president, Frank P. Parish. Operating offices were formerly in the Dwight Building, Kansas City. Executive offices of Missouri-Kansas are maintained in the Otis Building, 10 S. La Salle Street, Chicago.



You *can't* go wrong on a Teeple Electric Gas Valve

The Teeple electric gas valve has been designed and built to do a better job than any valve yet developed for the industry. Not just the best valve for a certain type of installation, but the best all-around valve for the dozen and one various conditions that gas men are called upon to face in actual operation. Of first importance is the fact that the Teeple valve is **motor driven**—not a snap action magnetic type. It is smooth and positive in operation. It works quietly, dependably. Operates successfully with small door bell transformer because it consumes only 3 or 4 watts (at 10 volts). Does not have to be installed near the thermostat. Has surplus power which handles any gas pressure in commercial use. . . These and other points stamp the Teeple valve with superiority. And last but by no means least, the Teeple valve costs less to buy; costs less to install; costs less to operate; costs less to service. Whatever your experience with valves, it is our sincere belief that you will find the Teeple valve far and away the best you have ever used. A descriptive folder will gladly be mailed on request.

L. R. TEEPLE COMPANY, 540 East 9th St., Portland, Oregon

TEEPLE

TEEPLE

ELECTRIC GAS VALVE

Johnson Gas Appliances
for Every Purpose

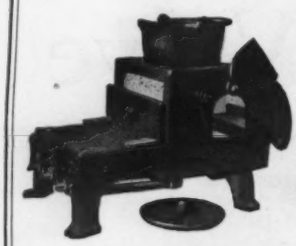
No. 305 Melting Furnace (Right)

The many exclusive construction features of the No. 305 have made it extremely popular. It is equipped with four powerful Johnson burners which provide intense heat without the use of a blower. The draw-off valve is so designed that it will not freeze and permits the easy removal of molten metal. 300 lb. melting capacity.

(Above) New Type Urn Burner

Johnson Urn Burners are made in a variety of sizes and are suitable for coffee urns or steam tables. May be purchased with or without thermostatic control. Embody many of the Johnson exclusive construction features which assure satisfactory service.

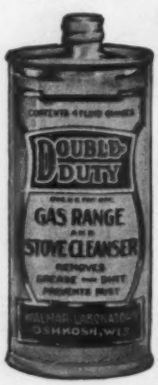
A Real Utility Furnace Johnson No. 118



Here is the utmost in moderately priced bench furnaces. The Johnson No. 118 Combination Bench Furnace will perform many heating jobs and do them all well. Will heat the largest soldering coppers, melt soft metals or may be used for heat-treating —all without the use of a blower. May be operated efficiently with artificial, natural or tank gas. Write for complete information.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative: C. B. Babcock Co.,
135 Bluxome Street, San Francisco



ATTENTION! Commercial Members Gas Companies

A Spic and Span gas stove is a credit to the house-wife and can be kept that way by the use of

Removes Grease

DOUBLE DUTY
REG. U.S. PAT. OFF.

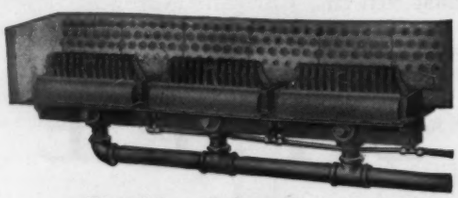
Prevents Rust

GAS RANGE & STOVE CLEANSER

WALMAR LABORATORY Oshkosh, Wisconsin

Western Distributor
C. B. BABCOCK CO., San Francisco, Los Angeles

R. M. C. Gas Burner



Durable Safe Economical

ROTARY MANUFACTURING CO.

5720 Long Beach Avenue Los Angeles, California

DISTRIBUTION SYSTEMS FOR LIQUEFIED NATURAL GAS

Thebo Starr & Anderton, engineers and contractors, are starting construction on carburetted butane plants and distribution systems in the towns of Brawley and Calexico in the Imperial Valley of southern California. These utilities, each of which is estimated to serve from 700 to 800 consumers, will be operated the first year by the Natural Gas Corp. of California.

Both plants are practically the same size and the equipment to be installed includes, in each town, two 15,000 gallon liquefied natural gas storage tanks, one 50,000 cu. ft. high pressure gas tank, along with complete automatic station equipment with compressors, regulators and pipe. A distribution system is also being laid down and gas will be carried to the towns under 10 lbs. pressure.

It is anticipated that the branch will be in operation in the early part of the month of August.

Construction is also scheduled to start during the month of June on similar plants at Isleton, Rio Vista, Vacaville, Suisun and Fairfield. These plants, varying in size and capacity according to the population of the localities to be served, will have storage tanks for liquefied gas from 4,000 to 15,000 gallons capacity and 12,500 cubic-foot holders. Gas will be stored in the holders under 75 lbs. pressure.

The last named localities are expected to be served with gas in the latter part of August or early in September.

RICHLAND GAS CO. BOUGHT BY LOUISIANA P. & L. CO.

The Louisiana Power & Light Company has recently acquired the Richland Gas Company, maintaining gas distribution systems in Rayville, Archibald, Mangham, Baskin and Winnsboro. The system is being operated under the supervision of J. B. Cash, district manager at Winnsboro and L. P. Woodard of the Phoenix Utility Company who has his headquarters at Rayville.

Electric service is maintained by the company in all of the towns with the exception of Rayville.

In May the Louisiana Power & Light Company was granted a gas franchise at Delhi, Louisiana. Gas will be supplied the city from the Southern Natural line to Birmingham and Atlanta.

HORATIO, ARK., GRANTS PERMIT TO M. W. GREESON

M. W. Greeson of Prescott, Arkansas, has recently been granted a natural gas franchise at Horatio, Arkansas. Gas will be supplied the town from wells near Ft. Smith, Arkansas, and will be available to the city within the period of a year.

E. Raymond Dutro, investment banker of Davenport, Iowa, is said to be backing M. W. Greeson in a project to pipe gas to a number of southwestern Arkansas towns including DeQueen and Mena.

The company also proposes to supply gas from the Fort Smith fields to Charleston, Dardanelle, Ola, Booneville and other towns lying southeast of the fields.

WEST. COUNTIES SOLD TO CENTRAL STATES P. & L. CORP.

Purchase of the Western Counties Gas Company has been announced by The Central States Power & Light Corporation, headquartered at Tulsa, Oklahoma. Western Counties owns and operates gas lines in Washita, Beckham and Custer counties, Oklahoma.

Never Need Adjustment!

No. 610 Eureka—10 flames; height, 24½"; width, 38"; depth 13". Finished in Ebony Bronze, Old Iron, Oxidized Brass, Statuary Bronze, Natural Bronze or Antique Brushed Brass.

No. 810 Aztec—10 flames; height, 24"; width, 33"; depth, 11½". Finished in Antique Brushed Brass, Oxidized Brass or Statuary Bronze.

Many Handsome Models

The illustrations above show two of the many models of Pacific Radiant Heaters. There is a style and finish to suit every purse and every taste.

A. G. A. Approval

Every Pacific New Feature Radiant Heater carries the famous Blue Star, signifying the approval of the American Gas Association from the standpoints of basic national safety requirements.

Trouble-Proof Pacific Burners Please Customers and Profit You

WHY SELL a radiant gas heater that must be adjusted (perhaps inaccurately) by the man who installs it? Any time later, for various reasons, it may get out of adjustment and cause a smoky, smelly flame.

The Pacific New Feature Burner has **no adjustable air mixers.** It is scientifically constructed **at the factory** to inject the correct amount of air. It never gets out of adjustment, always burns with an intense blue flame, is odorless, noiseless, and safe.

Pacific radiant fireplace heaters completely satisfy your customers, save you costly servicing, and carry the **good profit** of a quality line.

Note These Features

1. No adjustments to make on burners.
2. Burners instantly removable for cleaning — just lift out.
3. Operates perfectly on varying gas pressure.
4. So simple, efficient, and accurately constructed that service adjustments are practically eliminated.
5. Installation is cheaper and easier because it requires only a gas connection and no burner adjustment.

Write for Valuable Agency Proposal

We make an interesting and worth-while offer to any well established firm that is interested in selling more and better gas-heating appliances. Write today for full details of attractive dealer proposition.

Pacific Gas Radiator

Gas Heating **Company** *Headquarters*

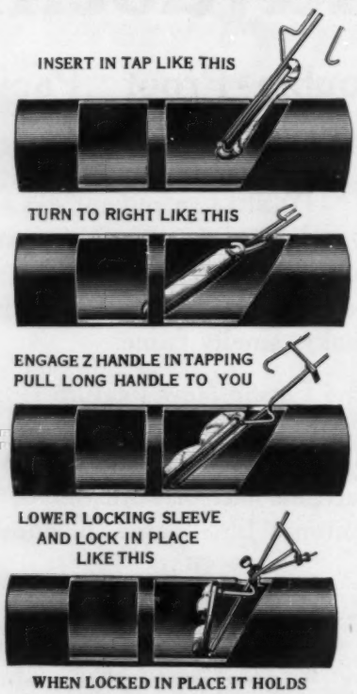
Roseberry and Walter Sts., Huntington Park, Calif.

MANUFACTURERS OF EVERY TYPE OF GAS HEATING APPLIANCE

PIPE STOPPERS

FOUR EASY STEPS

HOW TO USE THE GOODMAN STOPPER


INSERT IN TAP LIKE THIS
TURN TO RIGHT LIKE THIS
ENGAGE Z HANDLE IN TAPPING
PULL LONG HANDLE TO YOU
LOWER LOCKING SLEEVE
AND LOCK IN PLACE
LIKE THIS
WHEN LOCKED IN PLACE IT HOLDS

PLUGS MASKS Etc.

Safety Gas Main Stopper Co.

523 Atlantic Ave., Brooklyn, N. Y. Cable Address: Gastopper, N. Y.

Pacific Coast Representative: C. B. Babcock Co.
135 Bluxome Street San Francisco, California

STANDARD MANAGEMENT & OPERATING CORPORATION

225 Bush Street San Francisco, Calif.

PUBLIC UTILITY MANAGEMENT
ENGINEERING AND CONSTRUCTION
REPORTS AND APPRAISALS

The staff includes the following who have been associated with successful nation-wide public utility enterprises for several years past.

E. F. ENGLISH R. N. DREIMAN A. E. HALL
E. A. OLSEN J. B. WILSON CHAS. GRUNSKY

FORNEY

COMBINATION GAS and OIL BURNERS

For Power Plant and Industrial Uses

Write for Literature and List of Installations

FORNEY COMBUSTION ENGINEERING CO.

305 THOMAS BLDG., DALLAS, TEXAS

FISHER GOVERNOR OFFERS NEW REGULATOR TO THE INDUSTRY

The Fisher Governor Company is now offering to the gas industry a new house service regulator, called Type No. 725, and having the same operating features as the Fisher Series 700 regulators which were developed by the company three years ago for liquefied petroleum gas.

A feature of the regulator is the flat cantalever operating spring which is said by the manufacturer to eliminate lever, lost motion, friction, and bearing points. For a given pressure under the diaphraghm the force tending to close the valve increases as the valve approaches the seat. This is claimed to insure positive dead end shut-off.

Type No. 725 can be regularly furnished for initial pressure ranges from 1 pound to 5 pounds, 5 pounds to 25 pounds, and from 10 pounds to 300 pounds. Springs are furnished to cover a reduced pressure range from 0 inches to 20 inches of water. These can be funrished for all types of gas.

The body and cover are of semi-steel castings, valve seat is bronze and the inner valve is also bronze with special seat disc spun in place.

The company's circular No. 805 describes the new regulator.

MISSOURI POWER & LIGHT CO. ASKS BOONEVILLE FRANCHISE

The Missouri Power & Light Company, a subsidiary of the North American Power & Light Company, made application early in June before the city council at Booneville, Mo., for a franchise for the distribution of natural gas.

The action follows an agreement between the parent company and the Missouri-Kansas Pipe Line Company whereby gas from the Panhandle fields is to be distributed to towns in central Missouri from the gas carrier to be constructed by the Missouri-Kansas company.

It is expected that the Missouri Power & Light will make a similar application before the city council at Jefferson City, Mo., which it likewise serves with manufactured gas.

NEW DIRECTORS FOR NATIONAL SUPPLY MEN'S ASSOCIATION

At the annual meeting of the board of directors of the National Supply Men's Association held recently, B. L. Potter, Cooper-Bessemer Corp.; J. H. Satterwhite, Westcott & Greis, Inc., and Alfred W. Burket, Jackson Engineering Company, were elected to the membership of the board.

M. F. Waters of Hanlon-Waters, Inc., is president of the Supply Men's Association, which is affiliated with the Natural Gasoline Association of America.

O. R. MARVEL NAMED PRESIDENT OF EMPLOYEES ASSOCIATION

At a recent meeting of the Employees Association of the Los Angeles Gas and Electric Corporation, Los Angeles, California, O. R. Marvel was elected president; Wm. Haeckel, vice-president; and Arthur Maltitz, treasurer.

The inaugural banquet and ball, at which the new officers and directors are to be installed, will be held at the Breakfast Club on July 8.

COLORADO GAS & FUEL CO. IS INCORPORATED AT $200,000

The Colorado Gas & Fuel Company has been incorporated with a capitalization of $200,000, at Lamar, Colorado. Arthur K. Lee, H. A. Galligan and Frank M. Johnson filed the articles of incorporation.

Sell more GAS

THERE is one sure way of selling more gas in your territory, and that is to increase the amount of gas consumed by each meter. The largest potential increase in the gas load comes through the use of gas for home heating purposes.

Today, scarcely 200,000 homes burn gas for home heating. Certainly a very small percentage when considered from the standpoint of actual homes now piped for gas. Many gas companies are realizing that they must extend their consumer service by maintaining a home heating department, if they expect to increase their gas revenue.

And the ideal method of burning gas in the home, where the present heating system is satisfactory, is the installation in these homes of the Roberts Controlled Gas Heating Unit. Hundreds of tests in hundreds of homes and by gas companies themselves — have shown conclusively that the Roberts burns gas automatically and economically.

Learn the full story of building the gas load through the home heating department. Send for the new book shown at the right. There's no obligation. It gives practical merchandising plans used by gas companies the country over.

"Sell Health and Comfort, Build the Gas Load" is the title of this new book. Gladly will we send you a copy without the slightest obligation. It gives the complete story of gas home heating merchandising.

ROBERTS CONTROLLED GAS HEATING UNIT

ROBERTS-GORDON APPLIANCE CORPORATION

DELAWARE AVENUE AT TUPPER STREET

CURTISS BUILDING BUFFALO, N. Y.

TRADE MARK

It Keeps the DISCHARGE

From Compressor

CONSTANT

WHEN discharge pressure rises, suction is throttled. Thus discharge pressure cannot exceed a fixed point.

CF

THROTTLING REGULATOR

ONE of 40 regulators produced with skill and care by the pioneer gas regulator manufacturers of America. C-F products, in range and applications, encompass all practical requirements.

Built especially for this service, the C-F Throttling Regulator is entirely dependable in uniformity of action. With performance always punctual as well as precise, it permits ideal compressor operating conditions insofar as constant discharge control is any factor.

The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes From 1 Inch to 24 Inches; For All Service. 1 oz. up to 2,000 lbs. Pressure to Square Inch.

28-40 Penn Avenue **Pittsburgh, Pa.**

REPRESENTATIVES:

WESTCOTT & GREIS, Inc.
Sales and Service
Dallas — Los Angeles — Tulsa

JNO. W. CRAWFORD
Sales Engineer
1855 Industrial Street Los Angeles

Or Any Jobber

A public utility sales policy is just as strong or just as weak as the sales force that executes it. Through a well arranged compensation plan and intelligent appreciation of the individual salesman's importance as a unit in its organization, the Southern Counties Gas Company has built up one of the most outstanding sales departments in public utility circles.

C. B. BABCOCK CO.

San Francisco Los Angeles

STANDARD GAS EQUIPMENT CORP. ISSUES PAMPHLET ON UNCRATING

The Standard Gas Equipment Corporation of New York recently published a four-page pamphlet describing the proper method for uncrating and handling enameled gas ranges to prevent the chipping and damaging of enamel. This method may be applied to any make of range.

All uprights and diagonals are sawed close to the bottom of the crate, the crate is then lifted free of all parts of the range, and the bottom of the crate can be used for carrying the range to the place of installation without taking hold of the door handles, cook top, cock handles, high shelf brackets or other parts of the appliance. Two ranges may be butted end to end in the gas company truck without the danger of sliding into contact with one another.

JACKSON CO. L. H. & P. TO MAKE IMPROVEMENTS DURING SUMMER

As a part of the construction program announced for the summer months by the Jackson County Light, Heat & Power Company at Independence, Missouri, the company plans to convert the communities of Englewood, Maywood, Fairland Heights, Mount Washington and Fairmount from an intermediate pressure system to a low pressure system.

This program will entail the laying of about 11,000 feet of 6-inch pipe, 3,000 feet of 4-inch pipe and some 8-inch and 2-inch. The company will employ about 30 additional men to carry out this part of the construction program. The above communities are located between Independence and Kansas City, Missouri.

NINETEENTH ANNUAL SAFETY CONGRESS SEPT. 29—OCT.4

September 29 to October 4 are the dates set for the Nineteenth Annual Safety Congress and Exhibition to be held at Pittsburgh, Pennsylvania, with the Fort Pitt and William Penn Hotels as headquarters.

The Public Utilities Section meetings will be held Tuesday and Wednesday mornings and Thursday afternoon, at the Fort Pitt Hotel.

The exhibit to be held in conjunction with the Congress will display new types of equipment designed for greater safety and efficiency.

FOUR PAGE LETTER FEATURING PAYNE CONSOLE INSTALLATIONS

The Payne Furnace and Supply Co. Inc., of Beverly Hills, California, has published a four-page letter which contains "real life" illustrations of typical Payne Console heater installations.

On the inside pages are featured the six main selling points of the new Payne Console.

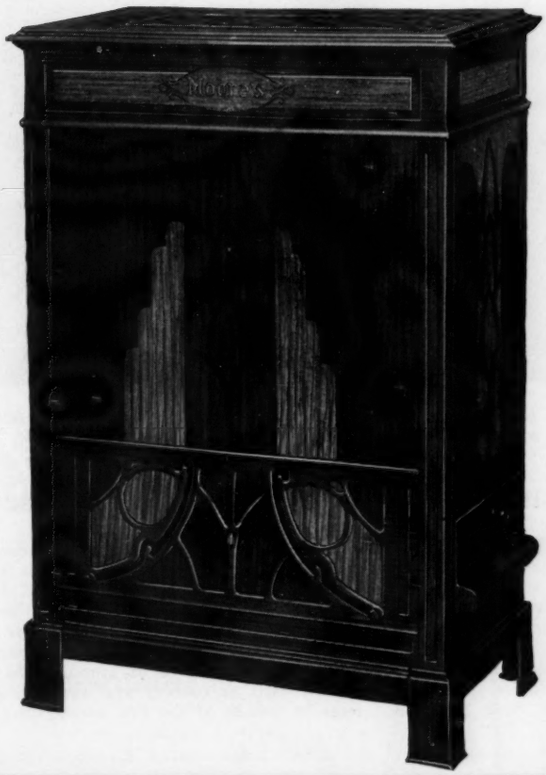
This letter was designed principally for the use of dealers as a letter head, affording a convenient medium for answering inquiries regarding the new Payne product.

A. C. BALCH NAMED DIRECTOR OF SO. CAL. GAS CO.

A. C. Balch, vice-president of the Southern California Gas Company of Los Angeles, has been elected a director of the company to fill the vacancy created by the resignation of A. E. Peat.

Robert A. Hornby, valuation engineer, has been named comptroller and assistant treasurer, and W. E. Robbins, formerly carrying the title of auditor, has been given the new title of general auditor.

MOORE'S Announce.....



An Addition To

The Famous Line of

MOORE'S

Puritan Heaters

Positive Circulation

with

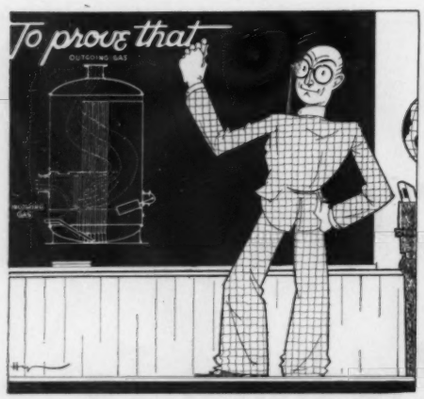
Abundant Controllable Radiant Heat

There is a Moore's Gas Fired Circulating Heater for every heating requirement.

WRITE FOR DETAILS

Moore Brothers Company

Joliet, Illinois **Since 1857**



Mathematically Demonstrated

To prove that a Campbell MIST-D-FIER *installed on an incoming gas line equals complete elimination of ALL the oil mist and water mist.*

Let L=Line M=Mist
G=Gas D=Mist-D-Fier

Equation (1)
L+G+M+D=L+G—M

By cancellation, we have:
M+D=—M
Or D=—2M

Q. E. D. (MIST-D-FIER equals a double dose of no mist).

Likewise, Equation (2)
L+G+M+D=L+G—M+D

By cancellation, we have:
M=—M

Q. E. D. (What was something, after contacting the MIST-D-FIER, becomes nothing).

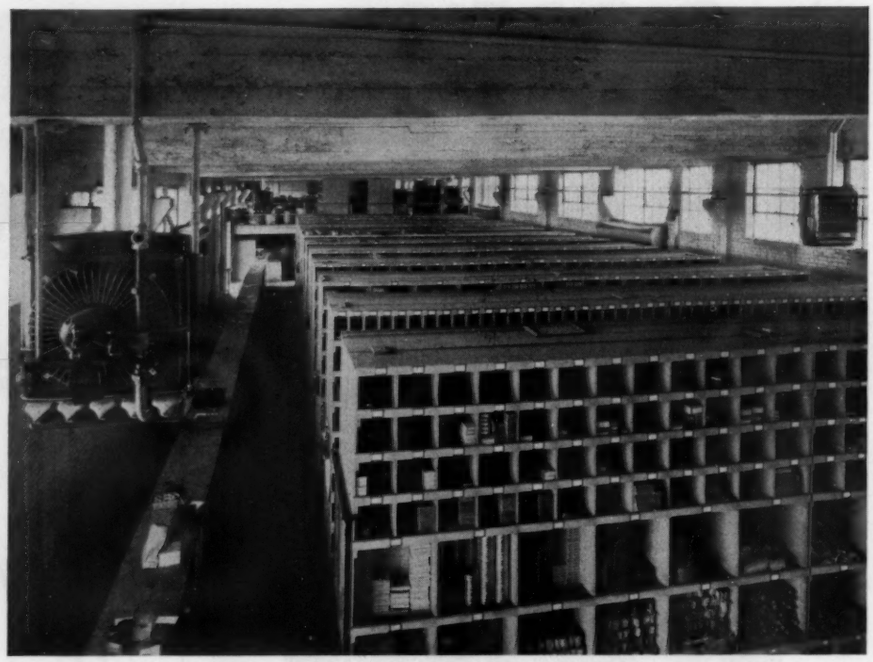
Baffling, isn't it, how the Campbell MIST-D-FIER so completely baffles the mist? Knocks it out of the equation altogether.

Get out your pencil and write a few equations yourself, and you will find that they all lead to the same answer—mist plus a Campbell MIST-D-FIER equals no mist at all.

In the meantime write for Bulletin No. 6, the whole story of the MIST-D-FIER.

J. A. CAMPBELL CO.
Natural Gas Engineers
CONSULTING PHONE-416-93
DESIGNING P.O.DRAWER 669
CONSTRUCTING LONG BEACH, CAL.

STEARNS-ROGER MFG. CO., DENVER
MID-CONTINENT AGENCY

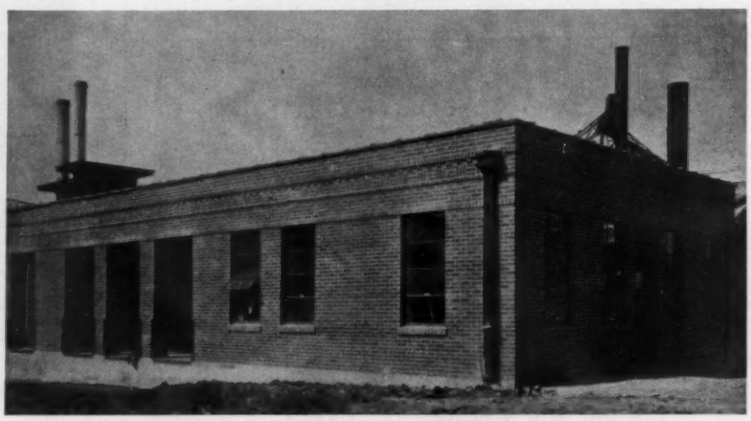


Storage warehouse of the Los Angeles Gas and Electric Corporation, showing installation of Humphrey commercial heating units.

Overhead Heating *for* Gas Company Warehouse

WILLIAM MADDOCK, storekeeper for Los Angeles Gas and Electric Corporation, calls attention to an interesting application of overhead heating units which has solved a problem for the gas utility itself.

The company has installed four Humphrey commercial heating units, No. 100, in its storage warehouse at 4800 Staunton Ave., Los Angeles, California. These units are suspended from the warehouse ceiling beams and the heat is controlled by an automatic device on the wall. The unit operation is economical, and the floor space saved can be utilized for storage purposes. During the hot days of summer the units can be used as cooling and ventilating systems by means of the fan arrangement.



New Shop Building *for* Houston Gas and Fuel Co.

HOUSTON Gas and Fuel Company recently completed a new service building at Houston, Texas, and the distribution, meter, shop and service departments have moved—this being the first move in 16 years.

The building is a one-story brick, with basement. The first floor will be used as office space, and the basement will provide storage room.

The old building, located directly opposite the new one, will serve as a warehouse for United Gas Company, of which Houston Gas and Fuel Co. is a subsidiary.

HASTINGS, OKLA. NOW SERVED BY COMMUNITY NATURAL

Hastings, Oklahoma, has recently been connected to the mains of the Community Natural Gas Company.

"COLD 70" PREVENTED

by new Minneapolis-Honeywell *LOW* LIMIT CONTROLS

FOR HOT WATER

Either Type L22-1 Low Limit Control (series 20 wiring) or Type B6510 (series 10 wiring) should be attached to boiler or main riser to prevent radiator temperature from dropping below desired minimum.

FOR STEAM

Either Type L22-2 Low Limit Control (series 20 wiring) or Type B6510-F (series 10 wiring) should be inserted between coils of one of the radiators.

FOR WARM AIR

Either Type L22-2 Low Limit Control (series 20 wiring) or Type B6510-F (series 10 wiring) should be installed in warm air duct near furnace to prevent complete cessation of warm air circulation.

Your customers are inclined to blame gas heating when the floors are uncomfortably cold even though the temperature at breathing level is warm.

Now "Cold 70", a common fault in any automatic heating installation, is easily corrected. Caused by lack of air circulation when radiators or warm air ducts remain cool during prolonged periods, air stratification is prevented in every home where the new Minneapolis-Honeywell Low Limit Control is installed.

This control, available for every type of heating system, calls for heat whenever the radiator or warm air duct drops to the low limit temperature. It causes the heating plant to produce just enough heat to keep the air in the rooms in motion at all times. Installed with the new *Nite Switch*, the Minneapolis-Honeywell Low Limit Control operates only when the 8-day clock thermostat calls for daytime temperatures.

Write today for complete information on the control that puts an end to one of the commonest heating faults. Minneapolis-Honeywell Regulator Co., Executive Offices: 401 E. 28th Street, Minneapolis, Minn.

California Branch: 557 Market Street, San Francisco.
Distributors: Portland, Seattle, Salt Lake City, Denver.

MINNEAPOLIS
HONEYWELL
HEAT REGULATOR

PREMIX
BURNERS
Get Results!
SUBMIT YOUR REQUIREMENTS
FOR ESTIMATE WITHOUT OBLIGATION

Tested and Proved by Competition

Ventite Inspirating Burners—7 sizes for intermediate and high pressure gas

Premix type available for low pressure gas

MAXON PREMIX BURNER CO.
INDUSTRIAL FUEL BURNING EQUIPMENT
MUNCIE INDIANA
WRITE FOR LITERATURE

Send for Booklet of Results

Represented by

The T. G. Arrowsmith Co.

661 Howard St.
San Francisco, Calif.

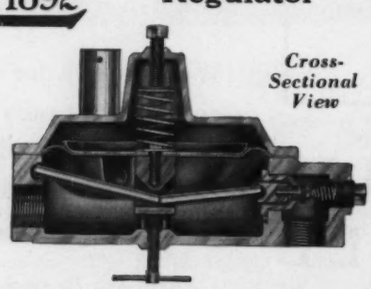
MUNCIE . INDIANA U. S. A.

Reynolds
Gas Control Since 1892

Products for all kinds of Pressure Reduction—for either artificial or natural gas.
GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.
REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.
VALVE—Automatic Quick Closing Anti Vacuum.

Reynolds Gas Regulator Company
Anderson, Indiana

Reynolds Little Giant Regulator



Cross-Sectional View

Line *to* Nebraska Centers Making Rapid Progress

A PROGRESS report on the construction of the Northern Natural Gas Comany line, issued shortly after the middle of June, showed that more than 60 miles of the line which will carry gas from the Texas Panhandle to points in Nebraska and Iowa, had been completed. Work is progressing rapidly on the line, according to officials, and natural service is expected to be available in Lincoln and Beatrice, Nebraska, about of the first of August.

The Northern Natural has recently announced its subsidiaries, which will construct and operate the system, as being: the Missouri Valley Pipe Line Company, the pipe line organization; the Interstate Production Company, the producing unit; the Northern Fuel Supply Company which will operate the gathering system; and the Nebraska-Iowa Natural Gas Company, the distributing unit. The ownership of the Northern Natural is vested in the Lone Star Gas Corporation, which controls 30 per cent of the project, the United Light & Power Company and the North American Light & Power Company controlling 35 per cent each.

Construction contracts on the line are held by Smith Bros., Inc. of Dallas, who have the contract for the line extending north from Clifton, Kansas, and O. J. Fredell Construction Company of Amarillo, who has charge of the construction of the 100-mile unit of the line from Ashland, Kansas, south to Carson and Moore Counties, Texas. Smith Bros., Inc., have located operating headquarters at Clifton, and O. J. Fredell is operating from Dodge City, Kansas.

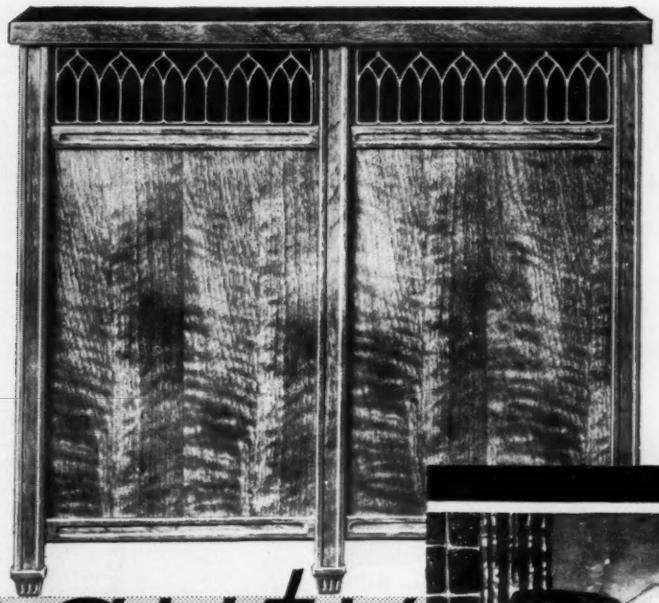
From a point near Ashland, Kansas, a line will be constructed tying in to the 16-inch line of the Kansas Pipe Line & Gas Company, a subsidiary of the North American Light & Power Company, line extending northward from the Medicine Lodge, Kansas fields. This line extends through Hutchinson, Abilene and Clifton to Grand Island, Nebraska.

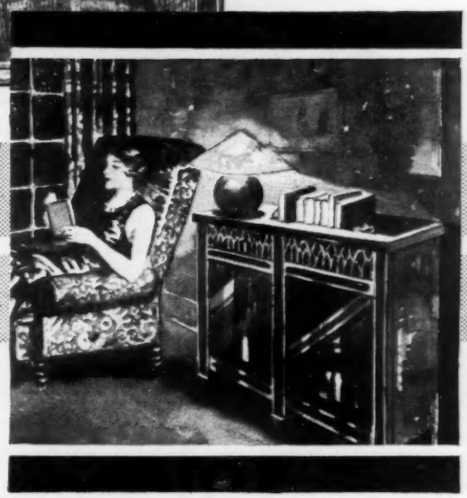
Under present plans construction on the Northern Natural, 24-inch line is being pushed more rapidly on the northern unit from Clifton northward, due to the fact that Medicine Lodge gas can be supplied to Nebraska towns until the unit from Ashland south to the Amarillo fields is completed.

The Lone Star Gas Company has charge of the construction of all compressor stations and river crossings. Three compressor plants are to be constructed on the line, with others to be added when needed. Two of the stations will be located at Clifton and Abilene with the location for the third station not yet selected. The Clifton and Abilene stations will be 5,000 and 6,000 h.p. respectively with plans for the third station calling for 10,000 h.p.

Among the cities to be served by the line are Lincoln and Beatrice, Nebraska; Red Oak, Shenandoah, Fort Dodge, Sioux City, Clear Lake, Mason City and Des Moines, Iowa. Manufactured gas plants are owned in Lincoln, Beatrice, Red Oak, Shenandoah, Fort Dodge, Mason City and Clear Lake by the United Light & Power Company. The North American Light & Power Company serves manufactured gas in Des Moines, with the Lone Star Gas Company serving manufactured gas at Council Bluffs.

The officers of the Northern Natural are: Clement L. Studebaker of Chicago, president of the North American Light & Power Company, chairman of the board; William J. Chamberlain of Chicago, president of the United Light & Power Company, president; L. E. Fischer, vice-president of the North





Beauty COMFORT

●● Here, at last, is a Cabinet Heater You Will be Proud to Install in your Home

Why recommend or sell any heater that is, at best, a temporary make-shift?... that disfigures even the humblest room?... or serves a useful purpose, at the most, only three to five months out of every year?

Women look upon the Payne Console Heater as a welcome addition to their home surroundings... a stand or table of modern design and finish that brings beauty as well as comfort!

Once installed, it becomes a "beauty spot" instead of an eye-sore. It takes up no more space than a bookcase. It circulates fresh, pure warmth on a moments notice, yet top and sides remain cool always . . . no scorched walls or rugs . . . no hot spots to burn the children's fingers . . . no cold floor drafts to cause discomfort. Clean, pure, warm air circulates in every nook and corner. Vent carries unhealthful gas fumes out of doors.

Here is a real all-season load builder. A heater that sells on both appearance and performance. Why offer your customers any heater that offers less? Complete sales literature and prices sent on request.

PAYNE Console HEATER

MANUFACTURED ONLY BY THE PAYNE FURNACE AND SUPPLY COMPANY INC. BEVERLY HILLS, CALIFORNIA

THERE'S A PAYNE HEAT SYSTEM FOR EVERY CLIMATE AND BUILDING

Know Your Specific Gravity!

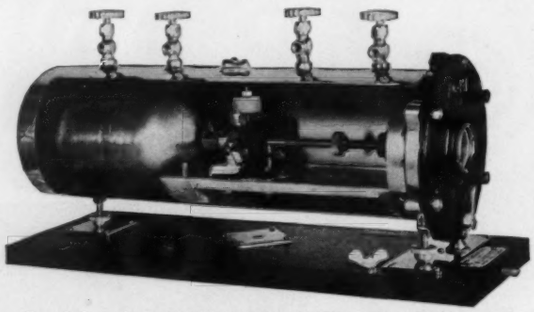
The Improved AC-ME GAS GRAVITY BALANCE

Has Been Adopted by the Natural Gasoline Association

As a means for determining the specific gravity of Natural Gas

Accurate

Portable



Four Spring Type Recommended by Bureau of Standards

Send for descriptive folder "W"—also Bulletin No. 14-W, showing our complete line of scientific ACcu-rate-MEasuring equipment.

The Refinery Supply Company

BRANCH:
3404 Main St.
Dallas, Texas

621 E. 4th St.
Tulsa, Oklahoma

Pacific Coast Rep.
The Braun Corp.
363 New High St.
Los Angeles, Calif.

The First Substantial Improvement in Storage Water Heaters

THE heater is finished in lustrous enamel.

300-lb. test copper-bearing Steel tank.

New Efficient Insulating Material.

Safety Pilot.

Combination Safety and drain valve.

2 sizes: 25 gal.—40 gal.

Pittsburg Monarch Superfine Automatic Storage Water Heater

Made in 2 Sizes
25 Gallons—40 Gallons

Pittsburg Water Heater Company

Offices at:

478 Sutter St.
San Francisco

2010 Jackson St.
Dallas

242 So. Western Ave.
Los Angeles

American Light & Power Company, and L. B. Denning, president of the Lone Star Gas Corporation, vice-presidents.

The executive committee are: B. J. Denman, vice-president of United Light & Power Company; L. E. Fischer and L. B. Denning; H. A. Berta, treasurer of the North American Light & Power Company, treasurer; D. A. Hulcy, assistant to the president of the Lone Star Gas Corporation, secretary.

H. R. Maxon is construction engineer for the entire line and is making his headquarters at Ashland, Kansas. Operating headquarters of the Northern Natural are at Omaha.

N. G. E. AND WEBSTER JOIN SALES FORCES IN MID-CONTINENT

Natural Gas Equipment Incorporated announces the appointment of the Webster Engineering Company as exclusive distributor for Wilgus gas pressure regulators and N. G. E. gas burners in states east of the Pacific Coast, effective July 1.

With additional sales and service facilities provided by the Webster organization, representation will be more accessible to the mid-continent territory, according to the company.

The present Natural Gas Equipment personnel in the Tulsa office, including V. E. Ready, resident engineer, and Julian Monax, sales engineer, will be retained and added to the Webster organization. The offices of Natural Gas Equipment Inc. at Tulsa will be discontinued, and all business of both companies will be transacted from the Webster offices at 415 South Peoria Street, Tulsa.

MORAN CORP. GETS FRANCHISE AT ROCKPORT, TEXAS

The Moran Corporation, recently purchased by the United Gas Company, has been granted a gas franchise at Rockport, Texas.

Distribution systems are owned by the company in Taft, Gregory, Portland, Aransas Pass and Ingleside in southwest Texas. The company contemplates construction of a 31-mile transmission line running from the White Point gas fields in San Patricio county to these towns.

WEST TEXAS GAS CO. MOVES HEADQUARTERS TO LUBBOCK

Headquarters of the West Texas Gas Company have been moved from Amarillo to Lubbock, Texas, where the company will occupy an entire new building now being constructed. The new structure will house the company's general offices as well as a commodious salesroom.

M. L. Gilfillan has been employed as new business manager for the company and has moved to Lubbock, Texas, from San Angelo.

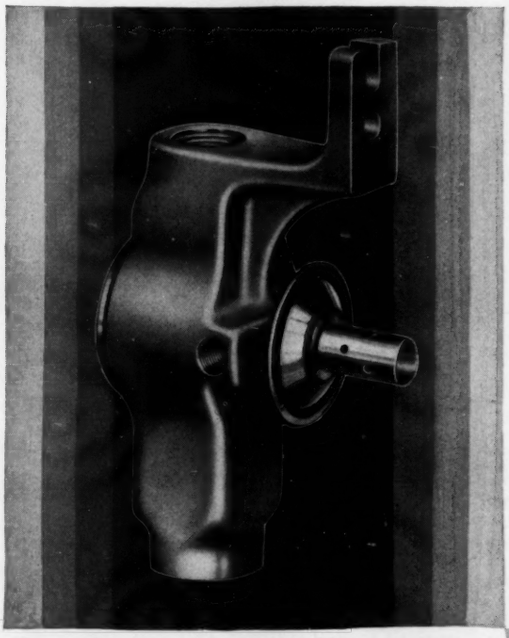
GARDEN FARMS, TEMPLETON AND OCEANO GET "NATURAL"

Natural gas service was recently begun in Garden Farms and Templeton, California, and is being started in Oceano, by the Santa Maria Gas Company with headquarters in Santa Maria. Garden Farms is in the Paso Robles district, Templeton in the Atascadero district, and Oceano is in the Pismo Beach district of the company.

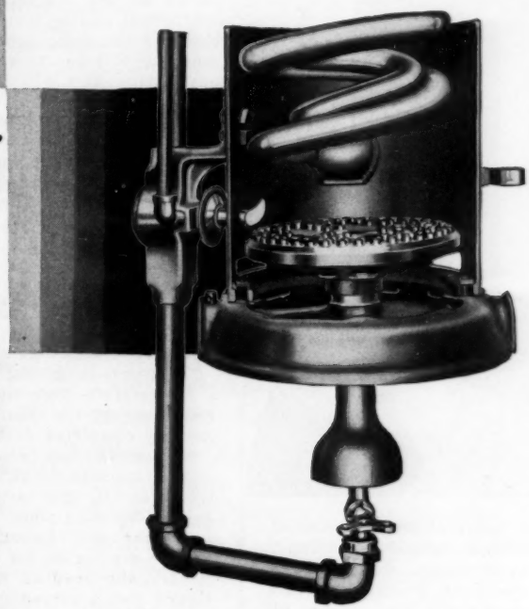
J. C. BARNETT GETS MENARD NATURAL GAS FRANCHISE

J. C. Barnett of Menard, Texas, has secured a gas franchise to supply Menard, and is seeking franchises at Eden, Mason, Fredericksburg, Kerrville and Junction. Mr. Barnett has gas producing properties 6 miles northeast of Menard.

THE KLIXON SAFETY PILOT FOR CIRCULATING TANK HEATERS



Contains the Famous.. SPENCER THERMOSTATIC DISC



THE Klixon Safety Pilot is built around the famous snap-acting Spencer Thermostatic Disc, which insures reliability and economy of operation. There are no moving parts except the disc and the main gas valve. There are no adjustments to make,—no service to give. It acts with a powerful click that makes the valve self-cleaning. Installation can be easily and quickly made, and is profitable to handle, for there is but one style and size for all heaters. For prices or additional information write—now.

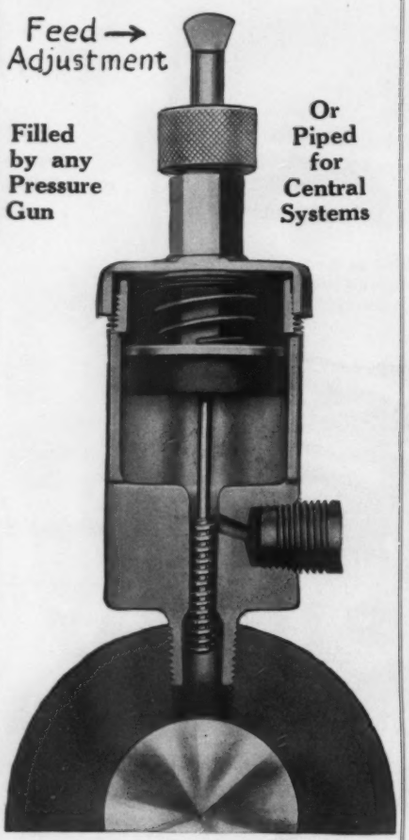
SPENCER THERMOSTAT CO

CAMBRIDGE · · · MASS

Pacific Coast Representative, B. W. MUELLER, 447 Sutter St., San Francisco, California

GUN-FIL

Positive Controlled Feed Lubricator



Constant lubrication is essential to cool, smooth running bearings, and to overcoming wear. Gun-FILS always feed just what each bearing requires. No waste of lubricant or sloppy condition at bearing.

Individual adjustment and interchangeable valves permit accurate feed control of lubricants from cup greases to heavy oils. GUN-FILS are suited to all sizes and types of bearings.

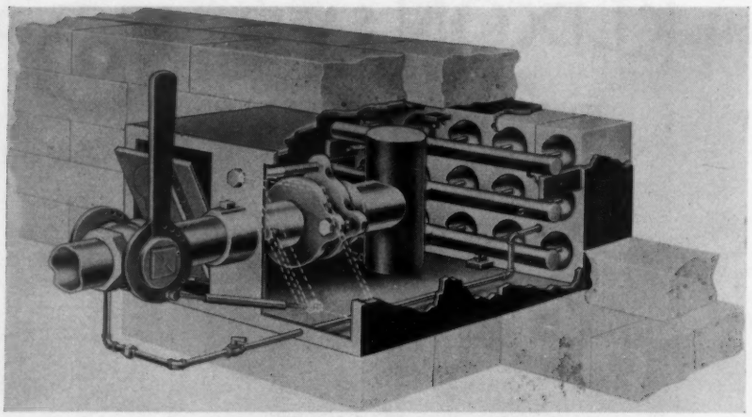
Let GUN-FILS solve your bearing problems. Give them a trial.

Distributed by

E. A. Key Co., Inc.

2814 Santa Fe Ave.
Los Angeles, Calif.

Distributors in all principal cities.



Phantom view of the new King synchronous burner.

Synchronous Burner Introduced *by* Dallas Firm

THE King Burner Company, Inc., of Dallas, Texas, manufacturer of gas appliances and combustion equipment, has placed on the market a gas burner with mechanical control features designed to synchronize the component factors of combustion. It will be known as King Synchronous Burner and will be sold with manual, steam pressure, and thermostatic control. King Synchronous control is the result of 20 years research and experiment on the part of the company engineers.

The corporate name of the company has been changed from King Gas Burner & Appliance Company to King Burner Company, Inc., and its capital stock increased from $30,000 to $50,000. Its headquarters are in the Burt Building, Dallas, Texas.

C. W. Windham is president and general manager; W. A. Catlett, vice-president; M. S. Fuqua, treasurer; C. D. Turner, secretary. Frank E. Austin, president of Austin Bros. Steel and associated companies, is chairman of the board of directors.

The company has recently enlarged its plant capacity, permitting a wider distribution of its product.

Munce Hall Provides Recreation *for* Employees

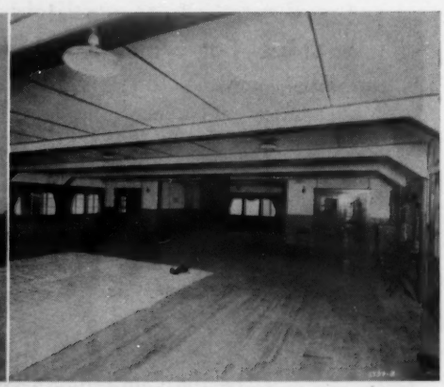
ARKANSAS Louisiana Pipe Line Company is giving due thought to the comfort, convenience and recreation of employees at the Munce compressor plant, recently completed at Sterlington, Louisiana.

Munce Hall has been erected on the banks of the Ouachita River, and is being used for social events, gymnastic contests, and as a general meeting place.

On the side facing the river are two rooms; the one on the northeast is used as a library and reading room, the other is designed for a recreation room, and is supplied with dominoes, checkers, and other games. A pool table is located between the two. The floors are waxed and polished and are kept in condition for dancing.

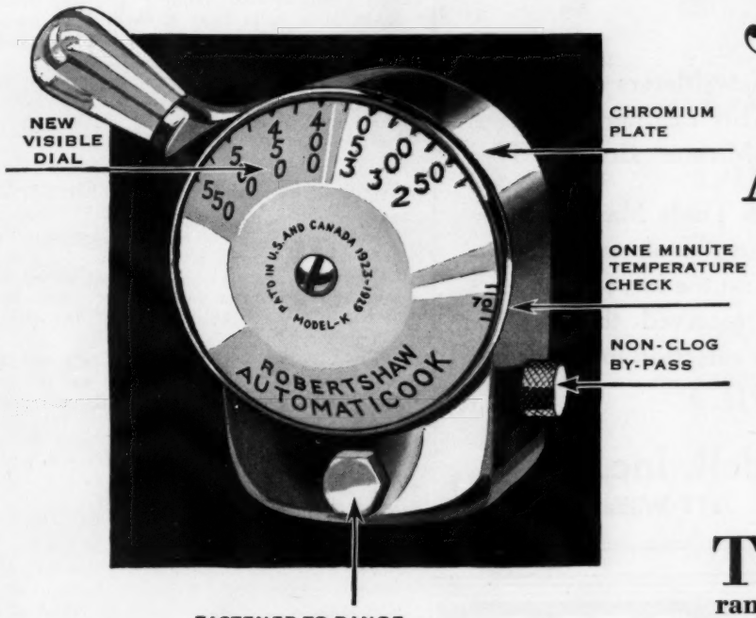
The gymnasium is equipped with a wrestling mat, adjustable punching bag, chest and weight pulleys, bars, and other apparatus. Provision has also been made for a boxing ring.

French doors provide a wide view of the Ouachita River for every part of the clubhouse, and a 10-foot screened porch extending the entire length of the building is fitted with swings, lounges and comfortable chairs.



LEFT: Exterior view of Munce Hall, Sterlington, Louisiana. RIGHT: Main recreation room, where gymnastic events, dances, and other employee gatherings are held.

Here it is!
The New Improved
"K" Type AutomatiCook *with 5 great Features*



THE NEW "K" type AutomatiCook has five great features to make gas range selling easier for you. Here they are: (1) Handsome chromium plate finish. (2) Fully visible dial. (3) Fool-proof One-Minute Temperature Check. (4) Non-Clog by-pass. (5) Only *one* bolt attachment to range.

The new AutomatiCook is smaller, more handsome, more compact. It's better looking. There's a One-Minute Temperature Check. Every working part is accessible from outside of range.

More than 100 makes of the new ranges will be AutomatiCook equipped this year. Learn all about this greatly improved heat control now. Write for full descriptive literature . . . *today!* It might result in your selling more ranges this season.

ROBERTSHAW AutomatiCook

ROBERTSHAW THERMOSTAT COMPANY
Youngwood, Penna.

PLAY SAFE!

By Specifying and Using

"COLONIAL" BRAND

Re-Chrome Meter Leather

in your New Meters and Repair Work. This Leather will stand the Five-Minute Boiling Test.

This Trade Mark stamped on each New Zealand Lambskin is our guarantee to you that each skin has received the greatest care in its selection and tanning.

Besse, Osborn & Odell, Inc.

51 South Street, Boston **177 William St., N. Y.**

If You Use

Refractories

You will want a copy of our new handbook and catalogue. Within its 68 pages will be found comprehensive information relating not only to the manufacture of fire brick, standard and special shapes, bonding materials and plastic fire brick, but also a vast amount of valuable technical information including tables, etc.

This useful handbook will be sent free to users of refractories.

Gladding, McBean & Co.

SAN FRANCISCO, OAKLAND, FRESNO
LOS ANGELES, PORTLAND, SEATTLE
SPOKANE

NO-OX-ID
IRON-OX-RUST
TRADE MARK
The Original Rust Preventive

Thoroughly protects pipe lines and gas holders

DEARBORN CHEMICAL COMPANY

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252 Spear Street
Phone Davenport 658

DEARBORN CHEMICAL COMPANY
NO-OX-ID-IZED WRAPPER
TRADE MARK
NEW YORK CHICAGO

UNITED ASKED TO SUPPLY GAS TO 42 LOUISIANA TOWNS

Forty-two cities and towns of southern Louisiana have, through the Southwest Louisiana Gas Company, entered a proposal to the United Gas Company for the construction of a natural gas transmission line into the section. The proposal is the result of a conference held at Opelousas, La., around the middle of June.

The United Gas Company has been given 90 days in which to consider the proposal and draw up plans for the line, which would tie-in to the trunk line of the Dixie Gulf Gas Company extending from northeast Texas to Port Arthur. The line would tie-in at a point near Kirbyville in southeastern Texas and would be approximately 150 miles in length.

Among the towns which would use the gas are Lake Charles, Opelousas, Jennings, Welsh, Lafayette, Elizabeth, Vinton and St. Martinville.

CARBON BLACK PLANT AUTHORIZED BY OKLAHOMA COMMISSION

Fred L. Coogan of Sayre, Oklahoma, has been granted permission by the Oklahoma Corporation Commission to construct maintain and operate a carbon black manufacturing plant in the vicinity of the Sayre gas fields.

The Consolidated Gas Utilities Company and the Western Counties Gas Company are taking gas from the Sayre field amounting to approximately 6,000,000 cubic feet per day. Daily production in the field is reported to be in excess of 600,000,000 cubic feet per day.

PERMISSION TO ISSUE STOCK GRANTED NEBRASKA NATURAL

The Nebraska State Railway Commission recently granted the Nebraska Natural Gas Company, a subsidiary of the North American Light & Power Company, authority to issue $500,000 worth of common stock; $1,000,000 in 7 per cent preferred stock and $1,000,000 in 7 per cent bonds. The issue will not be sold directly to the public but will be delivered to the parent company.

The Nebraska Natural has recently completed its gas line to Grand Island, Nebraska, and is constructing branches and laterals to a number of other towns in the territory as far west as Kearney.

FINAL HONORS DETERMINED IN SO. COUNTIES TOURNEY

L. G. Moore, commercial agent at Santa Ana, Calif., and F. H. Bivens, vice-president, for the Southern Counties Gas Company, won first and second honors, respectively, in the company's golf tournament which has been in progress for the past year. The concluding tourney in the series of 12 was played on May 25.

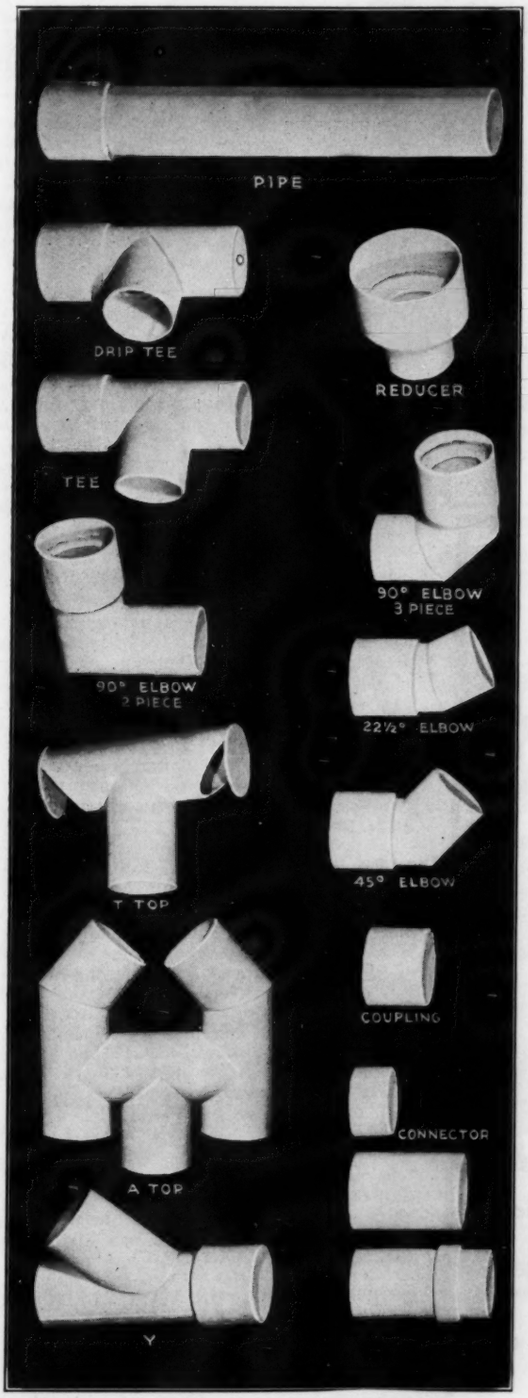
P. E. FLOUR RETURNS FROM MID-CONTINENT FIELDS

P. E. Fluor, vice-president and general manager of the Flour Corporation, Ltd., Los Angeles, Calif., has returned to the home office after a two-weeks visit through the mid-continent territory, during which time he visited the company's branch offices in Tulsa, Oklahoma, and Dallas, Texas.

T. B. CLAYTON GETS NATURAL GAS FRANCHISE IN OKLA. TOWNS

T. B. Clayton has been granted gas franchises in Canute, Foss and Corn, Oklahoma. Gas is to be supplied Canute and Foss by September 26, 1930.

VITEX



The Light, Durable and Non-Corrosive Gas Vent and Flue Pipe— is Easy to Install— Increases Draft, Improves Combustion, and Minimizes Condensation.

For Fully
Descriptive Catalogue
Write To

PLANT RUBBER and ASBESTOS WORKS

537 Brannan St. San Francisco

EMPIRE
Oil Meters

Positive Displacement Oscillating Piston Type

Simple in Construction—Easy to Operate—Low in Cost of Maintenance

EMPIRE meters are highly accurate, and **stay** accurate. They are invaluable for cracking and absorption processes; for gas companies; for refiners and distributors of gasoline and all distillates of petroleum; for measurement of crude oil, cold or hot.

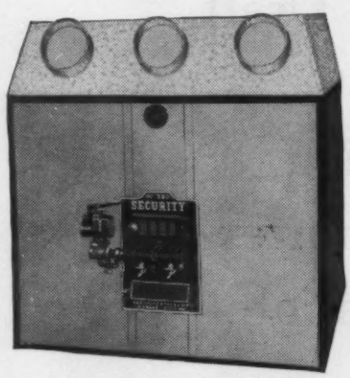
ALL SIZES ½" TO 6"

Standard meters will withstand working pressures of 150 lbs. to the square inch. High pressure types will handle 325 lbs. Higher pressures and special types to order.

National Meter Company

299 Broadway, New York

1048 Folsom Street, San Francisco **2309 E. 8th Street, Los Angeles**



We Manufacture a Full Line of Strictly

High Grade Gas Appliances

Including

Conversion Gas Burners
Circular Heaters
Warm Air Furnaces
Gas Ranges

Our Catalog is yours for the asking

SECURITY STOVE & MFG. CO.

Kansas City, Mo.

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

HELP WANTED—MALE

Salesman with car to sell gas burners for steam boilers, oil stills and industrial furnaces. Technical and practical training with sales experience necessary. Salary and mileage. Location, San Francisco. State age, salary and full details in first letter. Address Box No. E-76, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

SITUATIONS WANTED—MALE

House heating and industrial engineer with 20 years experience in the natural gas industry desires position with gas company or equipment firm. Applicant has thorough knowledge of all types of gas heating equipment, and is capable of organization work, as well as compiling manuals. Address Box No. B-97, *Western Gas,* 124 West Fourth Street, Los Angeles, California.

PAYTON TO MANAGE CLARINDA PLANT FOR PHILFUELS

F. C. Payton has been appointed as manager of the Clarinda, Iowa, butane gas plant of the Philfuels Company, subsidiary of the Phillips Petroleum Company, which has recently begun supplying gas to the city. Fifteen miles of gas mains have been laid in the city.

The butane is piped under pressure from the tank cars in which it is shipped, to four cylindrical tanks, from which distribution is made.

LEE B. METTLER CO. ISSUES NEW CATALOG ON COMPANY LINE

Lee B. Mettler Co., with headquarters offices at Los Angeles, California, recently issued a new catalog covering the entire line of Mettler gas burners, including the Mettler full automatic conversion burner, the latest development of the company. Installation specifications and blue prints are included.

Copies of the brochure may be had by addressing the company at 406 South Main Street, Los Angeles, California.

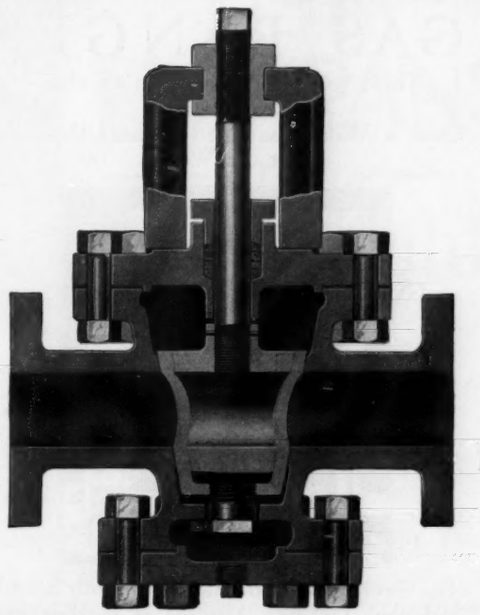
MORRO BAY AND SAN MIGUEL TO HAVE BUTANE SYSTEM

Santa Maria Gas Company of Santa Maria, California, recently began construction of facilities to bring butane service to the communities of Morro Bay and San Miguel, in San Luis Obispo County, California.

JOHN KEILLOR, OF B. C. ELECTRIC, ON TRIP TO ENGLAND

John Keillor, gas engineer of the British Columbia Electric Power & Gas Co., sailed early in June for England, where he will spend about two months.

FOSTER



PLUG VALVES

"Guaranteed for Ten Years"

1. Adjustable.
2. Non-Lubricated.
3. Removable Seat and Plug.
4. 100% Opening Through Valve.
5. Stainless Steel Plug.
6. No Friction Loss.
7. No Eddy Currents.
8. Cannot "Stick" or "Freeze."
9. Kerosene Tested.
10. Re-Packed Under Pressure.
11. Clean-Out Plug on Bottom.
12. Seats Removed Without Taking Valve From Line.
13. Sizes 2" to 6" Iron or Steel For All Pressures.

Exclusive Distributors

DUCOMMUN CORPORATION

Los Angeles San Francisco

SPRAGUE SEMI-CHROME LEATHER

Resists acids
and boiling water.

Now Used in All

SPRAGUE METERS AND REGULATORS

After

FIVE YEARS' TESTS AND EXPERIMENTS

May we send you
samples and data?

The Sprague Meter Co.

BRIDGEPORT, CONN.

Los Angeles, Calif., San Francisco, Calif.

Newark, Ohio

Davenport, Iowa Houston, Texas

WEBSTER Radiant Gas Burners

Some Said It Couldn't Be Done...But—

Mr. E. J. Ronsick, Industrial Engineer of the Texas Cities Gas Company, El Paso, did it with Webster Gas Burners.

And a difficult job it was! The oil burners already installed could not be changed or removed nor could the boiler fronts be altered in any way.

After much investigation, Webster Radiant Gas Burners were Mr. Ronsick's choice due to the fact that they are flexible enough to fit almost any opening. The burners, in this case, seemed to have been made just for such a difficult installation.

Again, through engineering skill and the superior construction of Webster Radiant Gas Burners, another job was made easy.

You have similar problems coming up all the time. We would remind you that Webster service stands back of every burner which you or our engineers install.

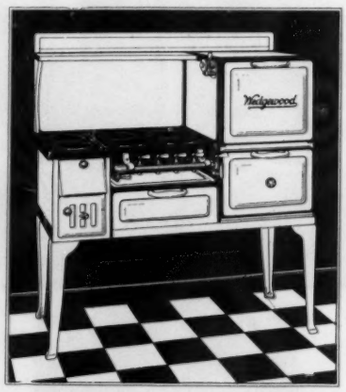
May we give you further information? . . . write today.

The Webster Engineering Co.
TULSA - OKLA.
Boiler Burner Division of
The Surface Combustion Co.
Subsidiary of Henry L. Doherty & Co.
2375 DORR STREET TOLEDO OHIO
Branch Offices in All Principal Cities
Member of Industrial Furnace Manufacturers Association

Wedgewood

GAS RANGES

Their popularity testifies to their supremacy.
Over a Million satisfied owners throughout the West.

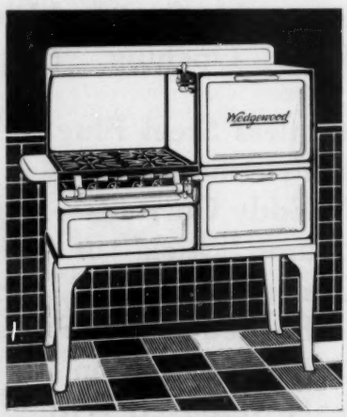


The evergrowing demand for both Standard and DeLuxe Models is further evidence of the superiority of the Wedgewood Gas Range line.

CLOSED TOP OR OPEN TOP

With or without kitchen heater.

The 1930 green and ivory all porcelain models make an irresistible appeal to housewives and are replacing old stoves where other sales inducements fail.



Wedgewood Cooking Recipes

are valued by thousands of Radio listeners. Also delightful music. Every Tuesday, 11:10 A. M. KPO - KGO - KFI - KGW - KOMO - KHQ - KSL

James Graham Manufacturing Company
Largest Stove Manufacturers in the West
Domestic and Restaurant Gas Ranges
San Francsico Newark, Calif. Los Angeles
Since 1882

USE FLEXPANS —and— Sleep Nights

—Instead of lying awake worrying about joint-leaks in your gas mains.

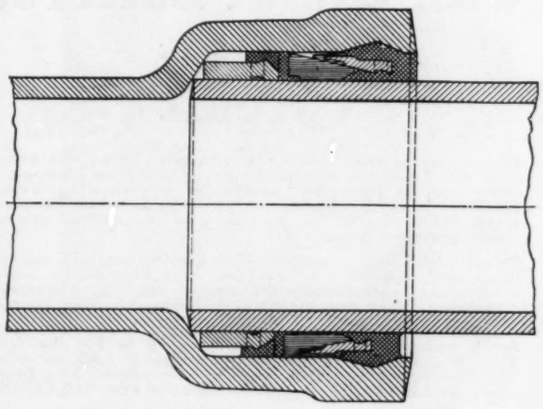
Regardless of expansion and contraction, line deflections, the heave and pull of frost—FLEXPANS HOLD THE GAS.

They End Pipe Coating and Coddling Too

With FLEXPAN JOINTS—you can use CAST IRON PIPE, the **only** victor over corrosion. An end to coating and coddling your mains, too.

McWANE-PACIFIC Cast Iron Pipe has a resilience you never knew existed—made of close-grained, tough, easily cut iron that "serves by the century" at low cost per foot and LOWEST cost per year.

Before buying another foot of ANY kind of pipe, investigate McWANE-PACIFIC FLEXPAN—the pipe that made high gas pressures possible with cast iron (permanent) pipe. (Warranted to hold 100 lbs. pressures.) Sizes now available, 1¼, 2, 3, 4, 6, and 8 inches.



Pacific States Cast Iron Pipe Co.

San Francisco, Los Angeles, Portland, Denver, Salt Lake

McWane Cast Iron Pipe Co.

BIRMINGHAM, PHILADELPHIA, CHICAGO, DALLAS

What JANITROL means

An Explanation of the New Name and Trade Mark Adopted for the Home Heating Unit

1. The name JANITROL represents a readily understood combination of the words "janitor" and "control."

2. It is indicative of the work performed by the unit — that of doing automatically all the duties of a fireman, janitor or "fix the furnace" man.

3. JANITROL is simple, easy to remember, and conveys the impression that manual control and furnace tending are unnecessary with this unit.

4. The pipes, burner head and gas flame used for the figure, and the wording on the shield, clearly indicate that JANITROL burns gas.

5. The position of the shield indicates protection and safety in burning gas.

6. The trade mark identifies a gas fired, home heating unit—making it impossible for the public to confuse this unit with coal stokers, oil burners, or other types of conversion units.

Let JANITROL help you build good will and a more profitable load.

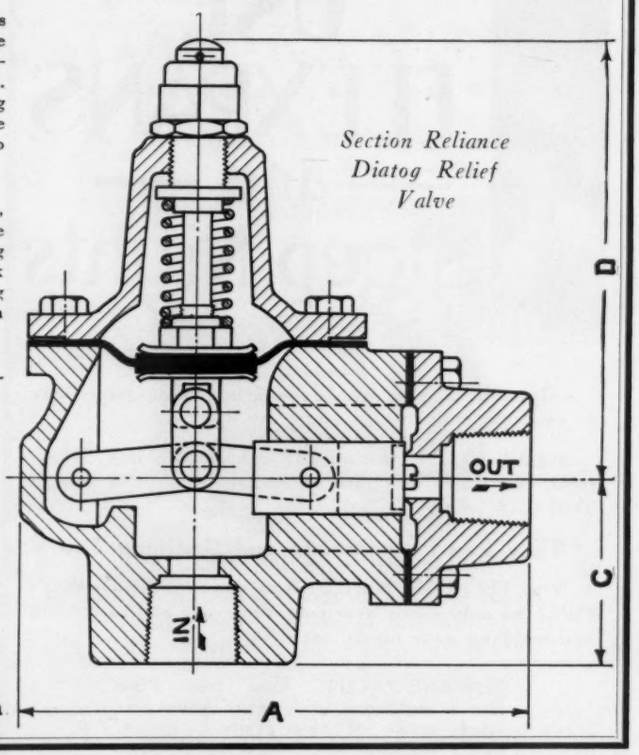
The Surface Combustion Co.
INCORPORATED
Subsidiary of Henry L. Doherty & Co.
2375 DORR STREET, TOLEDO, OHIO
Branch Offices in All Principal Cities
Mantle Recuperator Division — Webster Engineering Co.
Member of Industrial Furnace Manufacturers Association

Reliance Diatog Safety Relief Valve

THIS valve is used extensively in safeguarding consumer's service taken from high-pressure transmission lines. The installation is usually made between a high pressure reducing regulator and the ordinary house or service type regulator. This eliminates the danger of extreme high pressures being thrown against the house-type regulator, resulting in damage to the house regulator or subjecting meter and house piping to dangerously high pressures.

The action of this relief valve is very simple and positive, having a diaphragm actuating the valve through our toggle mechanism. The diaphragm spring is correspondingly strong and flexible, allowing sensitive adjustment and insuring quick shut-off after relief valve has blown. The range of popping pressures can be controlled from one pound to 125 pounds with the use of various sizes of springs.

These valves are made only in ¾" and 1" sizes. When ordering, please specify at what pressures you wish the valve to pop



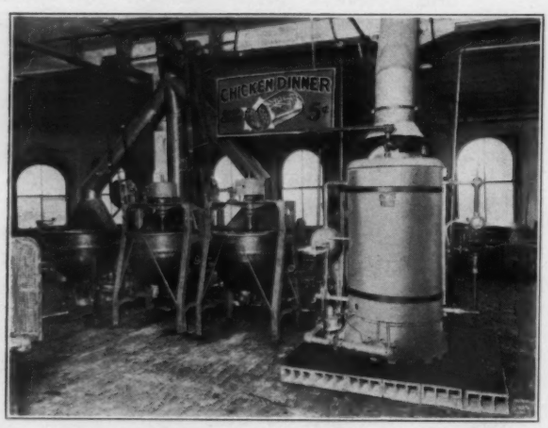
Section Reliance Diatog Relief Valve

Reliance Manufacturing Company

1000 Meridian Avenue Alhambra, California

Process Steam Users—

are Gas Users . . . with Ofeldt Boilers!



Food Processes, Textile Plants, Chemical Plants, Printing Establishments, Cleaners & Dyers, Bottling Plants and Dairies, Laundries, Hospitals, Bakeries, Hotels, Vulcanizers—all use the Ofeldt. . . . There are untouched Ofeldt prospects right in your territory —**Process Steam** locates them!

"Steam in 4 minutes" Ofeldt

Process steam users cannot always rely on surplus steam from the Power or Heating Boilers. Steam so obtained is often unfit for processing, because of impurities, fluctuating pressures, varying moisture content, and uncertain temperatures. That is why the merits of an independent process steam generator are obvious.

The OFELDT boiler is gas-fired and automatic. To the unquestioned economies of gas for this purpose, are added compactness, ease of operation, speed (steams in 4 minutes), cleanliness, utter dependability of steam flow, and absence of firing problems.

Stock boilers are made for pressures up to 100 lbs. from 1 to 25 h.p. Boilers for higher pressures built to order. Multiple units of the Ofeldt are not uncommon . . . Ofeldt users are gas users . . . significant! WRITE FOR BULLETINS.

MEARS-KANE-OFELDT

1903-1915 EAST HAGERT ST., PHILADELPHIA

New York—9 Park Place
Boston—100 Arlington St.
Chicago—363 W. Erie St.
Buffalo—Waldridge Bldg.
St. Louis—2010 Locust Blvd.
Birmingham—Am. Trust Bldg.

Makers of Automatic Gas Boilers for over a Quarter Century

Thanks to SPARK!

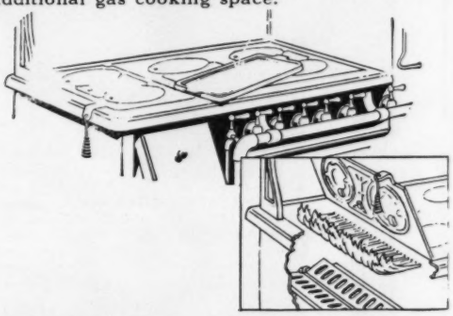
1/2

for creating a gas stove which has made it possible for your consumer to have a gas stove that gives

ONE-HALF MORE

gas cooking surface than any other stove of the same type and size.

This has been made possible by a PATENTED AUXILIARY GAS BURNER running the full length of the firebox directly under the cooking top—designed especially to furnish a **reserve** of additional gas cooking space.



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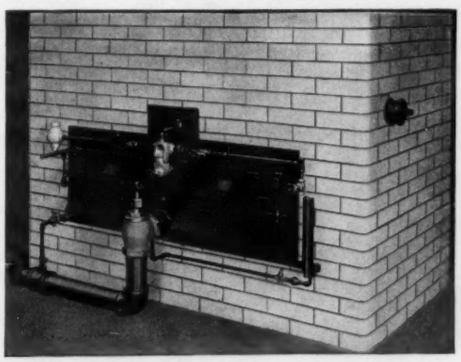

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Rear View—Same Installation—Note All Parts of Gas Burner Exposed to Radiant Heat or Oil Burner Flame are Protected by Refractories, Insuring Long Life.

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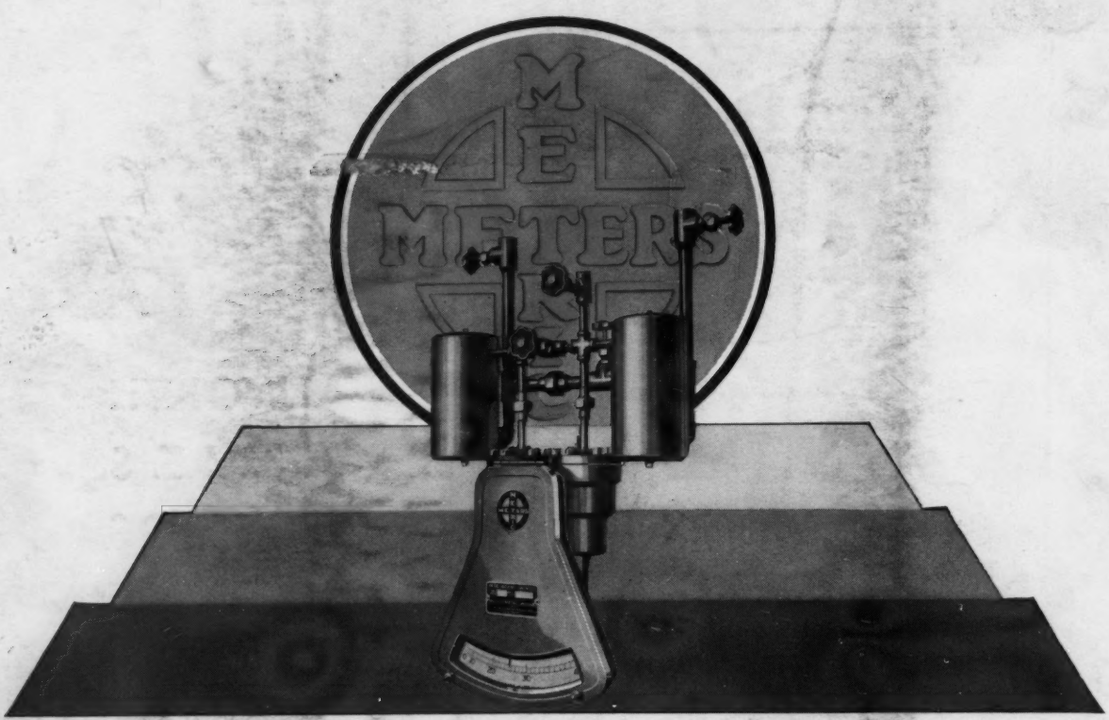

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